FOOD MANUFACTURE

Incorporating Food Industries Weekly

ILIFFE & SONS LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1. MARCH 1, 1954

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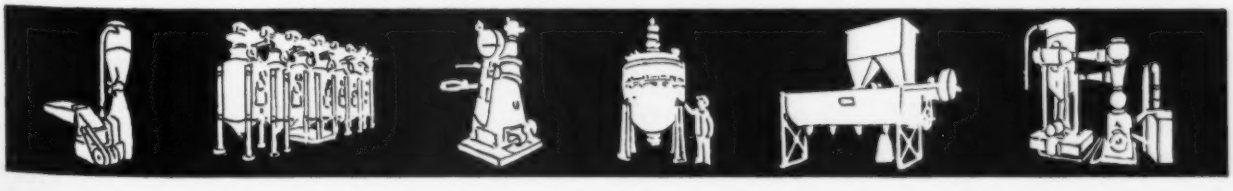

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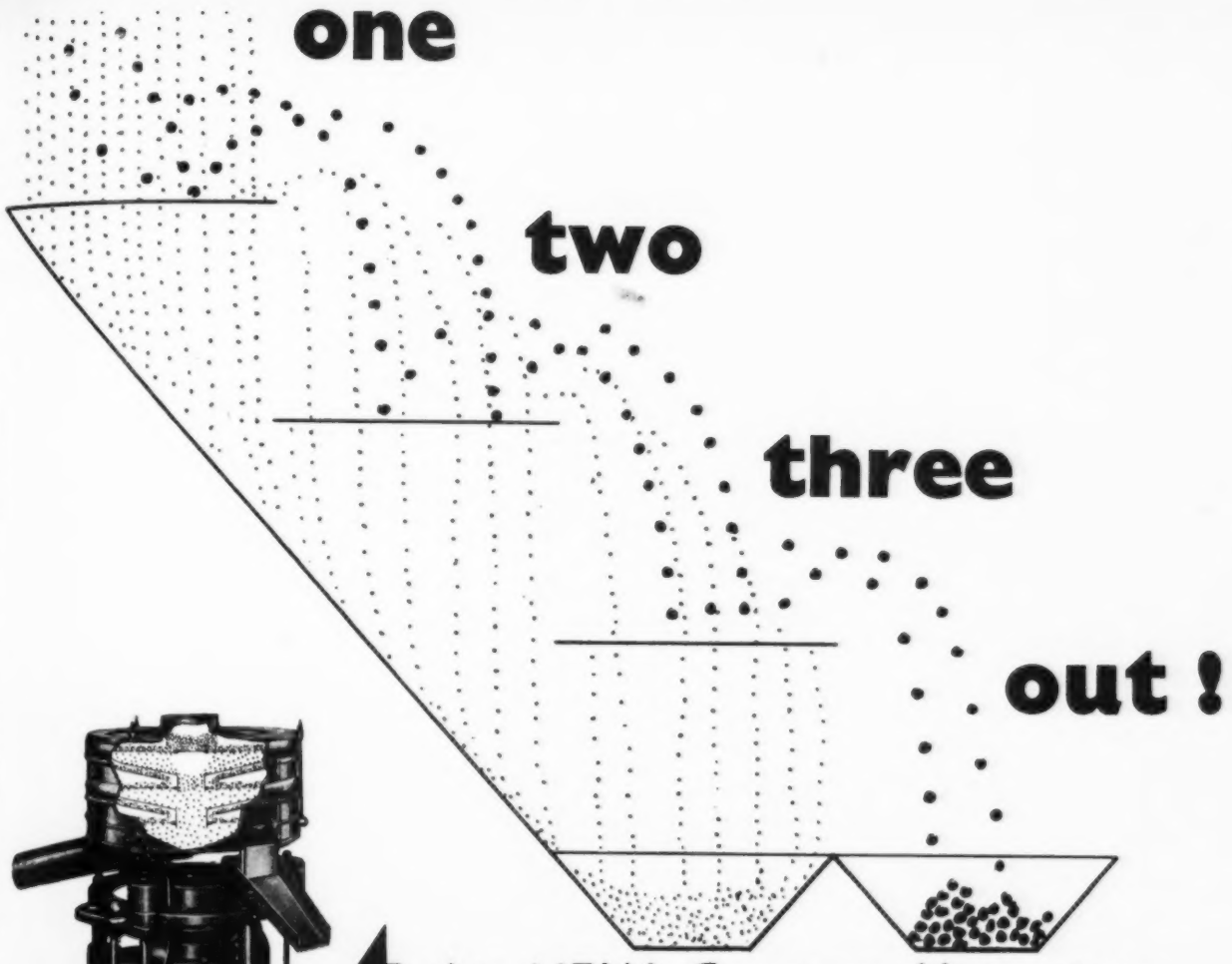

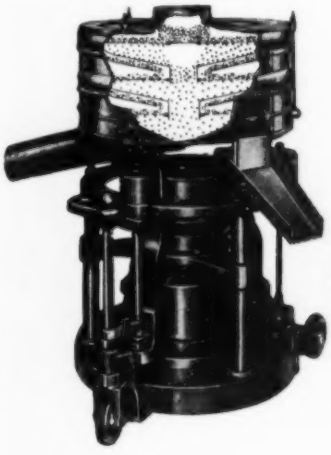

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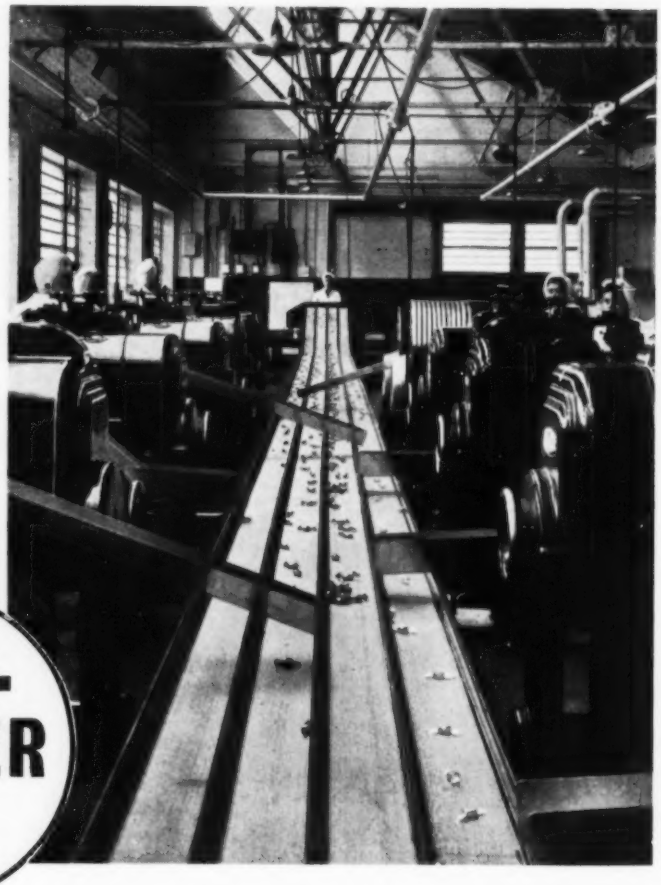

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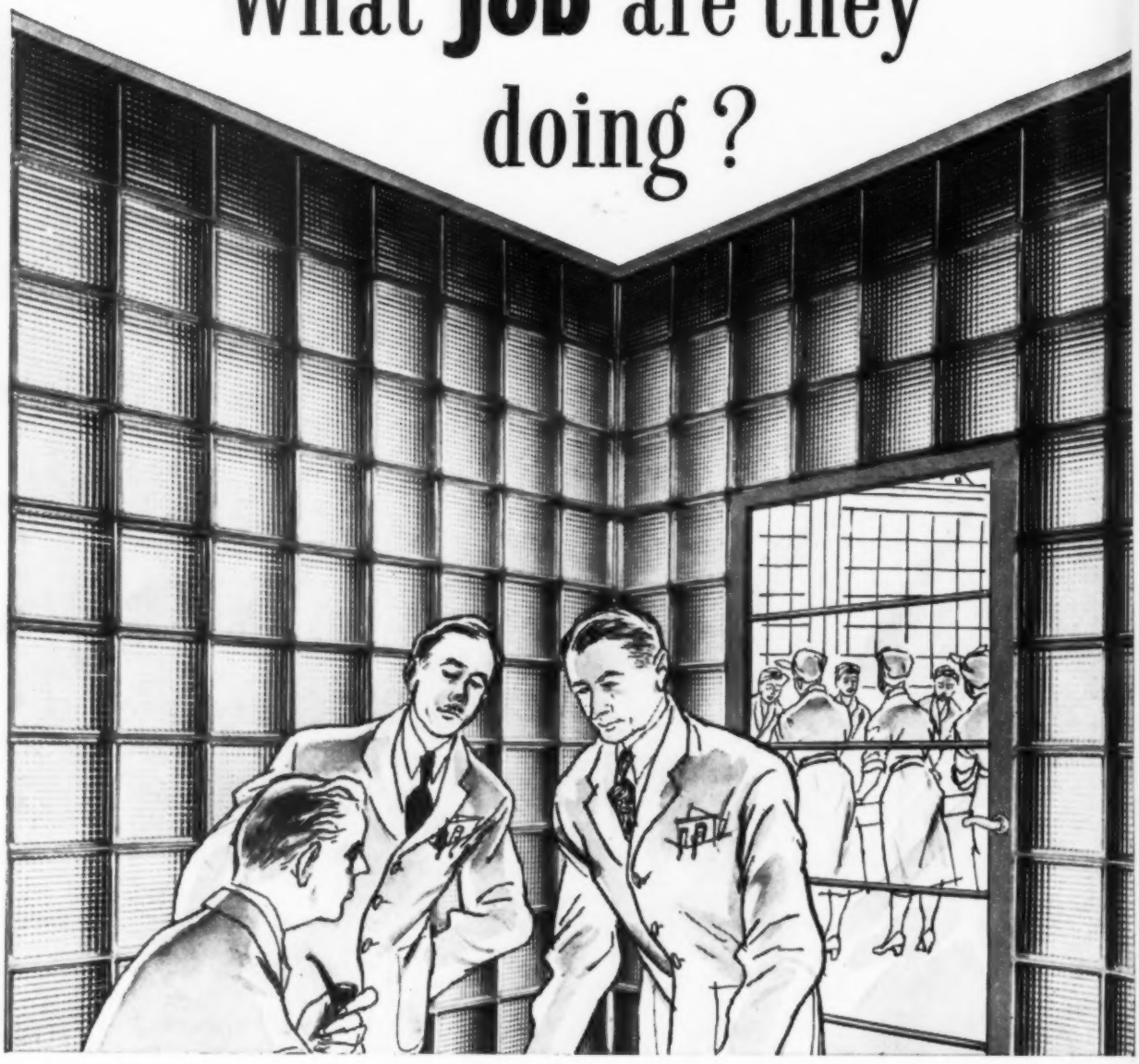

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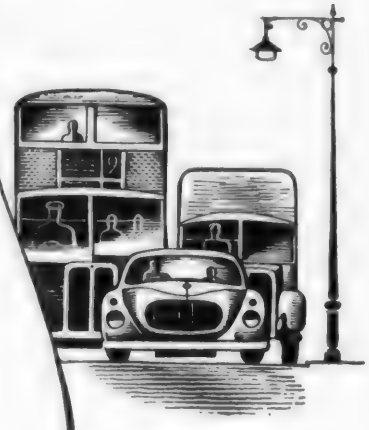

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More than 400 Brown & Polson Starch Products

The deep knowledge and wide practical experience we have gained by our huge and varied production for other industries is your guarantee that our starch products for the preserving industry will always be the best that can be made. And we can promise you knowledgeable and disinterested advice whenever you care to discuss with us proposed new uses for starch products in your business.

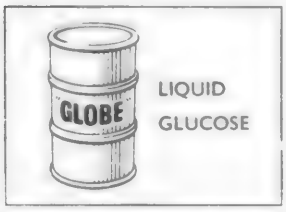
Starch
does surprising things
IN SUCH SURPRISING PLACES
STARCH IN ADHESIVES
Starch is the basis of a versatile range of adhesives which can be given a wide variety of special qualities to make them suitable for particular purposes: qualities such as quick or slow setting, great or small initial tack, resistance to moisture, harmlessness to colour, and the like. The sealing of cardboard packs is one of the many very large-scale uses of starch-based adhesives. Feculose Company Limited, one of the companies in the Industrial Division of Brown & Polson, have developed special, water-resistant adhesives with great success to solve packaging problems connected with export to humid tropical countries. Brown & Polson Industrial Division produce 200,000 tons of starch products a year: more than 400 products, which are helping more than 80 different industries to reduce production costs, to make better products, or even to make products that could not otherwise be made at all. We have spent more than 100 years in the building of this large and varied business. We have learned a lot about the industrial uses of starch products, and our advice is freely at your disposal.
CAN STARCH HELP YOU?
FECULOSE COMPANY LIMITED
B&P
Brown & Polson
WELLINGTON HOUSE 125 130 STRAND LONDON W C 2
Watch the National press for advertisements like this one. When you read how starch products are helping other industries you may see new possibilities of turning them to account in your own business.

for you, in the Preserving Industry

Most jam manufacturers have encountered the problem of making jams that contain enough soluble solids to be satisfactory in quality, yet are not too sweet for their customers' taste and will not crystallise in storage. Most jam manufacturers are also aware that the best answer to this problem is to use less cane or beet sugar (sucrose) in their jams and make up the required soluble solids content with " Globe " liquid glucose.

Glucose provides abundant food energy but is not as sweet as sucrose. When glucose is used in jam making to replace some of the sucrose it reduces excessive sweetness without reducing food value; it brings out the natural flavour of the fruit; it helps the jam to set; and it prevents crystallisation.

" Globe " liquid glucose is made from starch by Corn Products Company Limited—the Industrial Division of Brown & Polson—and we make the starch, too. Our careful control of every manufacturing process from the grain to the finished product is your assurance of the quality and purity you require in your preserves.



CORN PRODUCTS COMPANY LIMITED

THE INDUSTRIAL DIVISION OF B&P Brown & Polson

WELLINGTON HOUSE, 125-130 STRAND, LONDON, W.C.2

Why FLEXIBLE MOISTURE PROOF TRANSPARENT **Dio** *thene* (POLYETHYLENE) *is ideal for* PACKAGING *FOOD*

PROTECTIVELY TOUGH

DIOthene *stretches*, so is not easily burst nor punctured. It is unaffected by acids and alkalis; liquid proof; powder proof; moisture vapour proof. Virtually non-inflammable and frost resisting, it is excellent for tropical or deep freeze storage. DIOthene is ideal for packing in units or in bulk.

CLINICALLY CLEAN

DIOthene is extruded in tubular form at a very high temperature. It is *sterile*, and the all-important inner surface *remains* sterile. No plasticiser is used; the purest products can be wrapped indefinitely with no fear of contamination from within or without.

CUT COSTS

DIOthene is feather-light, so freight charges are low, and empty DIOthene bags take up almost no warehouse space compared with empty rigid containers. DIOthene is a "one-way package"; breakages, collections, invoicing of empties, and return freight charges are eliminated.

AND SELL

DIOthene, with its silvery sheen has immediate eye and appetite appeal. The customer can *see* your product in DIOthene and its silkiness adds that touch of luxury that prompts impulse purchase. It also ensures flavour protection. *Excellent re-use value for the housewife.*

in **Dio** *thene* (POLYETHYLENE)

We can offer you DIOthene bags and DIOthene drum liners to required sizes and thicknesses, plain or gussetted, for quick delivery. **Our special printing on DIOthene in monochrome or multi-colour — including gold — gives excellent ink adhesion.** We can add the properties of DIOthene to paper, board, foils or fabrics by coating or lamination — infinite possibilities! We make, convert, design and print DIOthene wrappings all under one roof. Send us your enquiries: ask for more details. Write or 'phone today.

TPL

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A SUBSIDIARY COMPANY OF TRANSPARENT PAPER LIMITED, MAKERS OF DIOPHANE, THE ORIGINAL BRITISH CELLULOSE FILM TH.5

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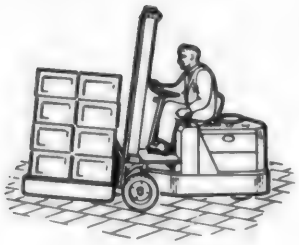
When planning heavy duty floors for factories



specify **Stelcon** ....

STEEL CLAD FLAGS

or

ANCHOR STEEL PLATES

•••• for permanent, level, steel cum concrete surfaces able to withstand the toughest of conditions

★ **dustless**

★ **hygienic**

★ **wear resistant**

Units are approx. 12" x 12" and are excellent for repair work as well as new work. Full details sent on request.

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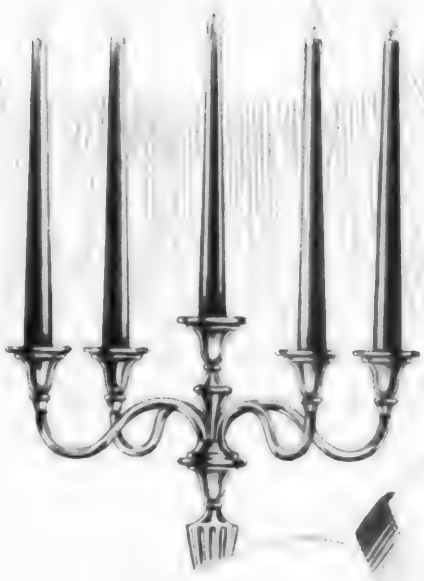

... OUR 25TH. ANNIVERSARY

We record with gratitude our growth during these years, and re-dedicate ourselves to providing the only Service specialising in Industrial Detergents

THE BRITISH HYDROLOGICAL CORPORATION

COLLOIDAL WORKS, HIGH PATH, MERTON, S.W.19. Telephone: LIBerty 1021 (4 lines)

Associated Companies: *Colloidal Detergents of Australia Ltd., Sydney, Australia: Chemical Services (Pty.) Ltd. Johannesburg. And at Copenhagen, Amsterdam, Brussels, Paris, Lille, Lyons and Ober-Winterthur, Switzerland.*

AT REIGATE...

OUR JOB
AS ESSENCE MANUFACTURERS

is to take natural products which have a flavour or aroma or both; extract from them the principles responsible for that flavour and aroma, and then prepare these principles in such a form as to be easily and conveniently and economically used by our customers.

We are specialists in this field and can offer guaranteed natural products which for quality and true flavour are in a class by themselves.

ESTABLISHED 1841

Reigate Brand

VANILLA NATURA

HEADS OUR RANGE OF NATURAL EXTRACTS

For full details of our Natural Products—write

WHITE, TOMKINS & COURAGE LTD

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"SILVER FOX" . . . *the metal of the age*

Registered Trade Marks

STAINLESS STEEL

There are few commodities more susceptible to contamination than dairy products and no metal better suited for handling them than stainless steel.
In a modern plant in North London, ice cream is produced under the most hygienic conditions and stainless steel is used, not only for metal parts coming into contact with the ice cream, but also for much of the internal decoration of the process room itself; thus preventing contamination and ensuring the maximum hygiene and ease of cleaning.

Creamery Package ice cream manufacturing plant in "Silver Fox" Stainless Steel, photographed in natural colour by permission of Toni's Cream Ices Limited, Edgware.

THE UNITED STEEL COMPANIES LTD

SAMUEL FOX & COMPANY LIMITED
Associated with The United Steel Companies Limited
STOCKSBRIDGE WORKS · Nr. SHEFFIELD · ENGLAND

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MALT FLOUR · DRIED MALT EXTRACT POWDER · MALT EXTRACT

Food manufacturers everywhere now use

FIONA MALT PRODUCTS

to give added distinction to an ever widening range of foods.

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MILK BEVERAGES
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CHEESES — PICKLES — WINES & VINEGARS

EDWARD FISON LTD IPSWICH

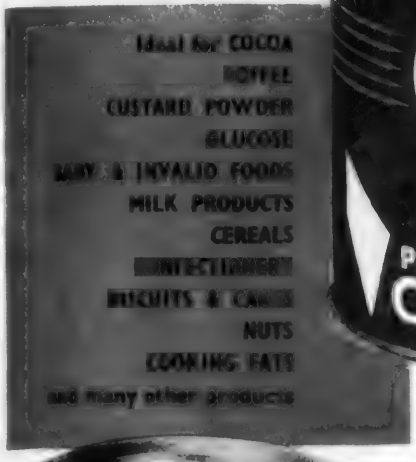
THE MALTINGS IPSWICH

Maltsters for more than a Century

COLLAR CANS

The new can with the hermetic closure and perfect "re-seal"

1. Hermetic Seal
2. Easy opening
3. Opening key supplied
4. Smooth "turned-over" edge
5. Hinged lid for perfect reseal
6. Colour printing direct on to metal



Metal Box *'Know-how'* does count!

THE removal of packaging restrictions allows this entirely new type of can to be supplied freely for the first time—and Metal Box capacity for quantity manufacture means that it is available at an economic price. The Collar Can has advantages for both manufacturer and consumer. It gives hermetic sealing. It is opened easily with the key provided. When opened the equivalent of a neat hinged-lid gives an efficient and convenient reseal. High quality surface decoration, printed direct on to the metal, can add sales and advertising value.

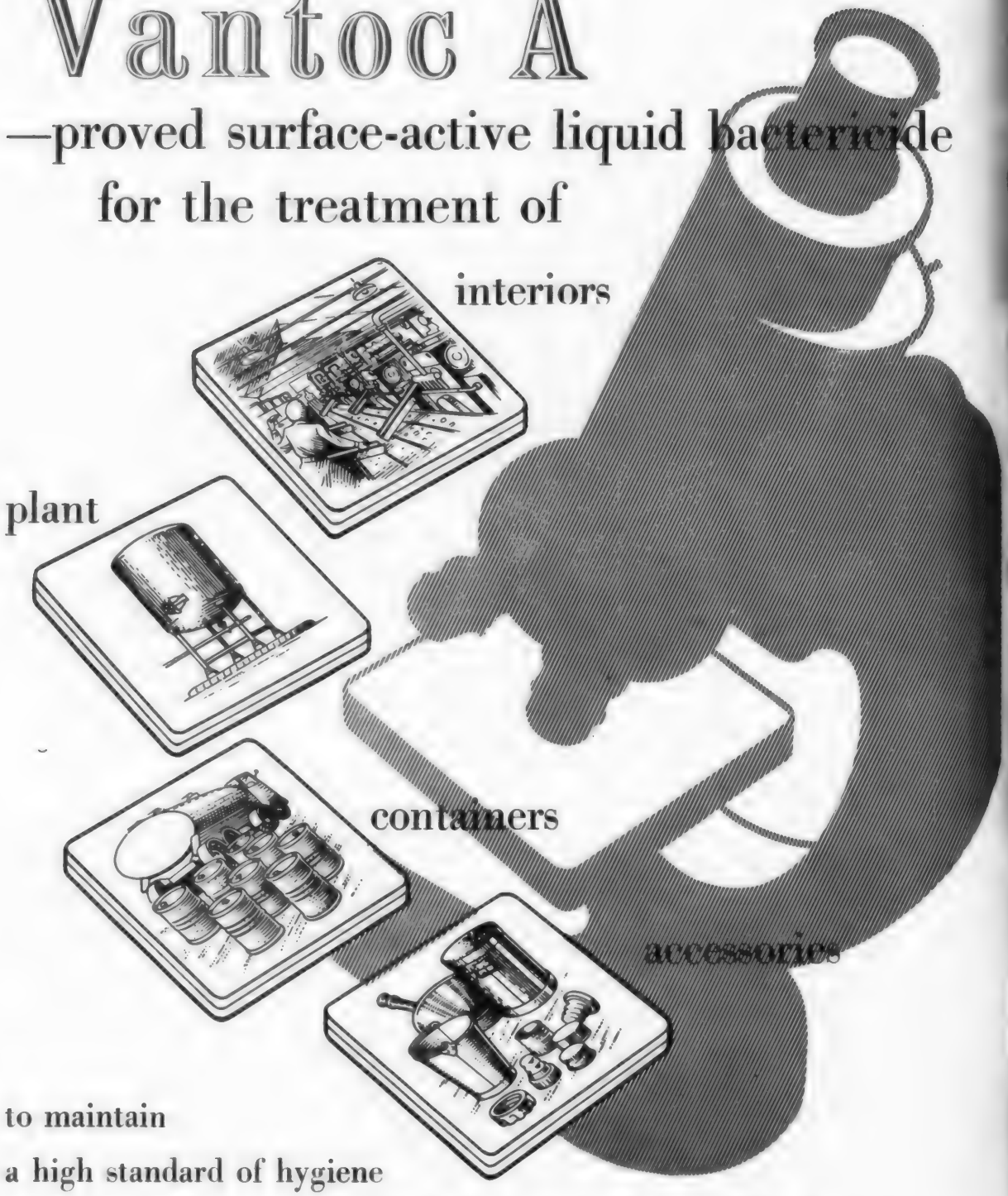
The Collar Can is precision made and designed for high speed filling and closing operations. It is ideally suited for most types of powders, solids and granulated products that need a hermetic seal to preserve freshness and flavour. An ingenious can proving that in container design and production Metal Box "Know-How" does count!

NO OTHER CONTAINER PROTECTS LIKE THE CAN

THE METAL BOX COMPANY LTD · THE LANGHAM · PORTLAND PLACE · LONDON W.1

Vantoc A

—proved surface-active liquid bactericide for the treatment of



to maintain
a high standard of hygiene
in the food processing, brewing and soft drinks industries

For further information please apply to:
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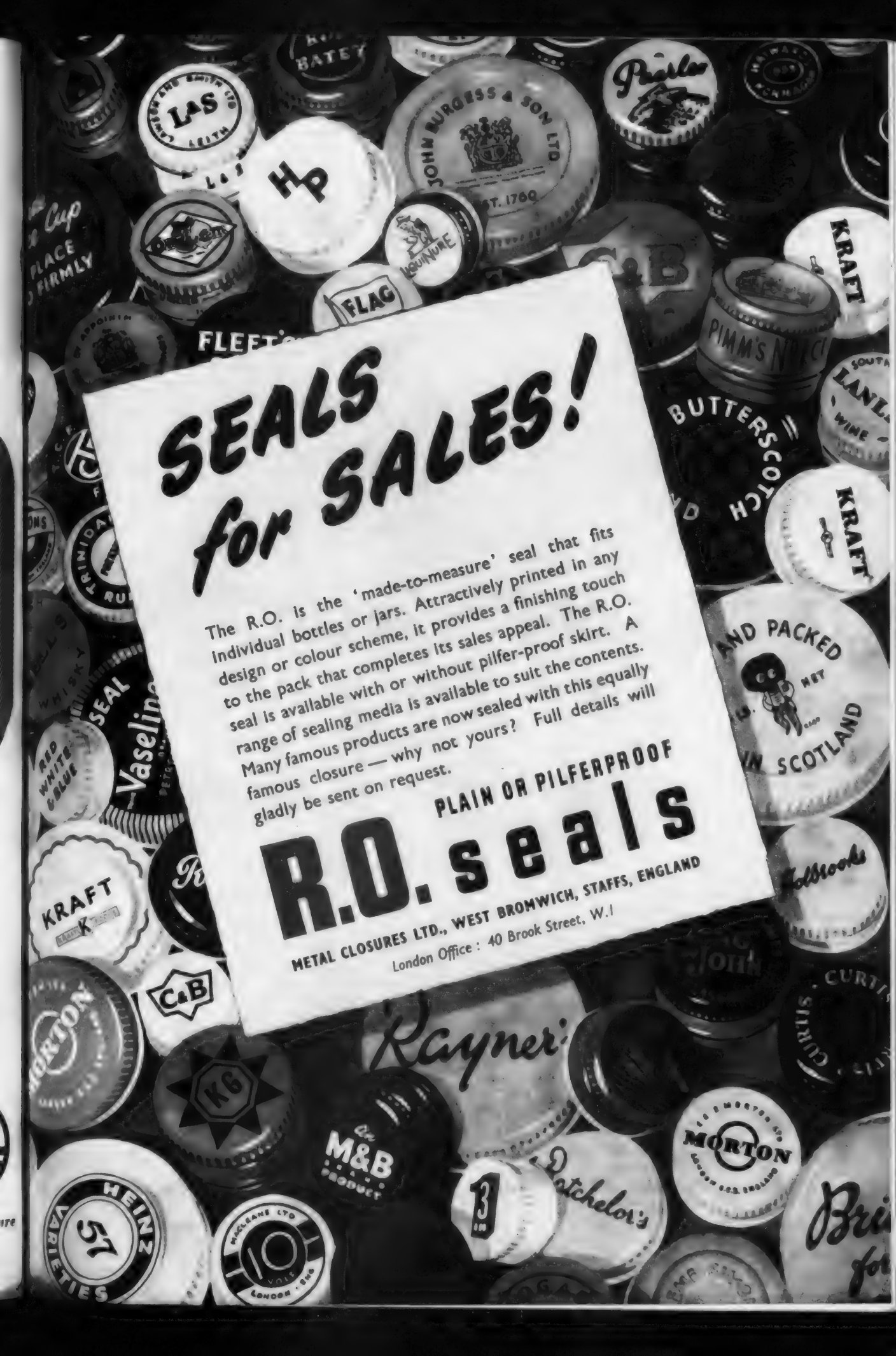
SEALS
for SALES!
The R.O. is the 'made-to-measure' seal that fits individual bottles or jars. Attractively printed in any design or colour scheme, it provides a finishing touch to the pack that completes its sales appeal. The R.O. seal is available with or without pilfer-proof skirt. A range of sealing media is available to suit the contents. Many famous products are now sealed with this equally famous closure — why not yours? Full details will gladly be sent on request.
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R.O. seals
METAL CLOSURES LTD., WEST BROMWICH, STAFFS, ENGLAND
London Office: 40 Brook Street, W.1

WE DESIGNED THIS NEW FOLDING BOX TO SAVE YOU STORAGE SPACE IN YOUR FACTORY- AND YOUR VANS.
AS LIGHT AS A FEATHER
AS SOUND AS A BELL
LET THE PHŒNIX PHIXIES PHIX YOU UP IN LIGHT, BRIGHT ALUMINIUM
AS FLAT AS A PANCAKE WHEN FOLDED AS WELL

"EMPTIES" no longer litter the active scene in gaping idleness. Their job done, they open out for rapid cleaning—then fold flat for space saving storage.

In your factory—in your customers' shops—in your collection vans, these new **PHŒNIX F.B.2. Folding Boxes**, give you strong, hygienic, lidded containers when in use and when folded they stack in a tenth of their own space. Assembly is a matter of seconds—by the turning of two lever locks.

Write for details, stating if possible your proposed use for the Phœnix Folding Box

Precision manufactured in lasting aluminium the Phœnix Folding Box can be embossed during manufacture with the owners' name. Made to order in the following sizes when assembled.

from 15″ × 10″ × 6″ to
20″ × 12″ × 10″

PHŒNIX *is the answer*

EQUIPMENT DIVISION **THE HESTON AIRCRAFT CO. LTD**

HESTON AIRPORT · HOUNSLOW · MIDDLESEX *Tel. HAYES 3844 (9 lines)*

It's New...

SIGMUND
PumPak

Exclusive Features include

★ NEW VENTILATION SYSTEM

The ventilation design keeps the bearings cool and completely free of gland seepage along the shaft.

★ REMOVABLE STATOR

No fuss, no special tools, no interference with pipe connections. Loosen four nuts and draw off the stator.

- *Choice of either Mechanical Seal or Soft Packing.*
- *Choice of materials.*

The Pump with the Removable Stator

SIGMUND PUMPS LTD.

To SIGMUND PUMPS LTD.
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Send me, without obligation, details of the Pumpak range.

Name .....

Address .....

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14

Have YOU tried ....

LEINER'S

NEW ICE CREAM GELATINE?

As a result of extensive scientific research P. Leiner & Sons Ltd. have perfected an entirely new ice cream gelatine stabiliser. Now in large-scale production in Leiner's modern factory at Treforest, this represents an important step forward in the history of edible gelatine manufacture.

No ice cream manufacturer should lose the opportunity of trying Leiner's new Ice Cream Gelatine Stabiliser or of benefitting from the improved results it gives when incorporated into an ice cream mix. Study the following facts about this new material:—

Dissolves with the minimum trouble
Ensures even dispersion of ingredients
Produces smooth even texture
Prevents roughness and crystal formation
Gives a good overrun to the mix
Promotes resistance to heat shock
Prevents shrinkage in the finished product

Leiner's new gelatine is so economical that only ¾ of the customary gelatine is required to produce a perfect ice cream

Should also be tried for ice lollies

Every batch subjected to rigid chemical and bacteriological control to ensure absolute purity

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Manufacturers of Gelatine for over a Century

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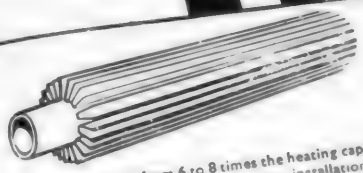
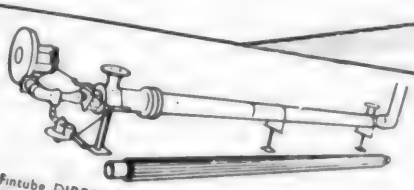
THESE WELL KNOWN PRODUCTS ARE NOW MADE IN ENGLAND

BY Brown FINTUBE (GREAT BRITAIN) Ltd

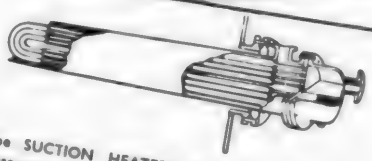


Fintubes provide from 6 to 8 times the heating capacity of bare pipe or tubing—saving space, installation and maintenance. Carbon steel, alloy or non-ferrous construction. 1" to 8" in diameter.

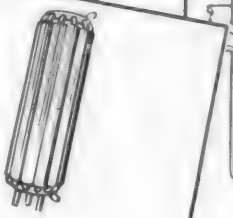


Fintube DIRECT FIRED AIR HEATERS—200,000 to 10,000,000 B.T.U. per Hr. for chemical processing, heating compressed gases, etc., without contamination. Temperatures to 1600° F. High fuel and thermal efficiency.

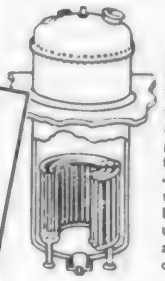
Fintube HEAT EXCHANGER SECTIONS standardise any gas or liquid heating or cooling problem. Changed over easily to different duties. They eliminate obsolescence, minimize fouling, reduce maintenance costs and stores investment.



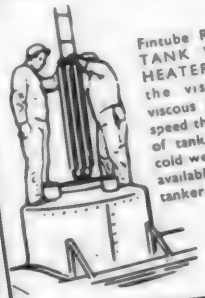
Fintube SUCTION HEATERS FOR STORAGE TANKS decrease pumping costs and speed delivery of viscous liquids being withdrawn from storage tanks. Can be mounted vertically to heat bunker oil in ships.



Fintube HEATERS FOR STORAGE TANKS—Greatest improvement in tank heating in 30 years. Vertical self-cleaning surface assures efficient heating. Tank bottom free of coils. Can be installed and serviced without steaming out the tank.



Fintube HEATERS FOR PROCESSING TANKS provide 4 to 10 times the heating surface of a bare pipe coil per cubic foot of tank volume—increasing the throughput per batch, shortening the heating cycle and reducing vessel costs.



Fintube RAILWAY TANK WAGON HEATERS lower the viscosity of viscous liquids and speed the emptying of tank wagons in cold weather. Also available in road tanker sizes.

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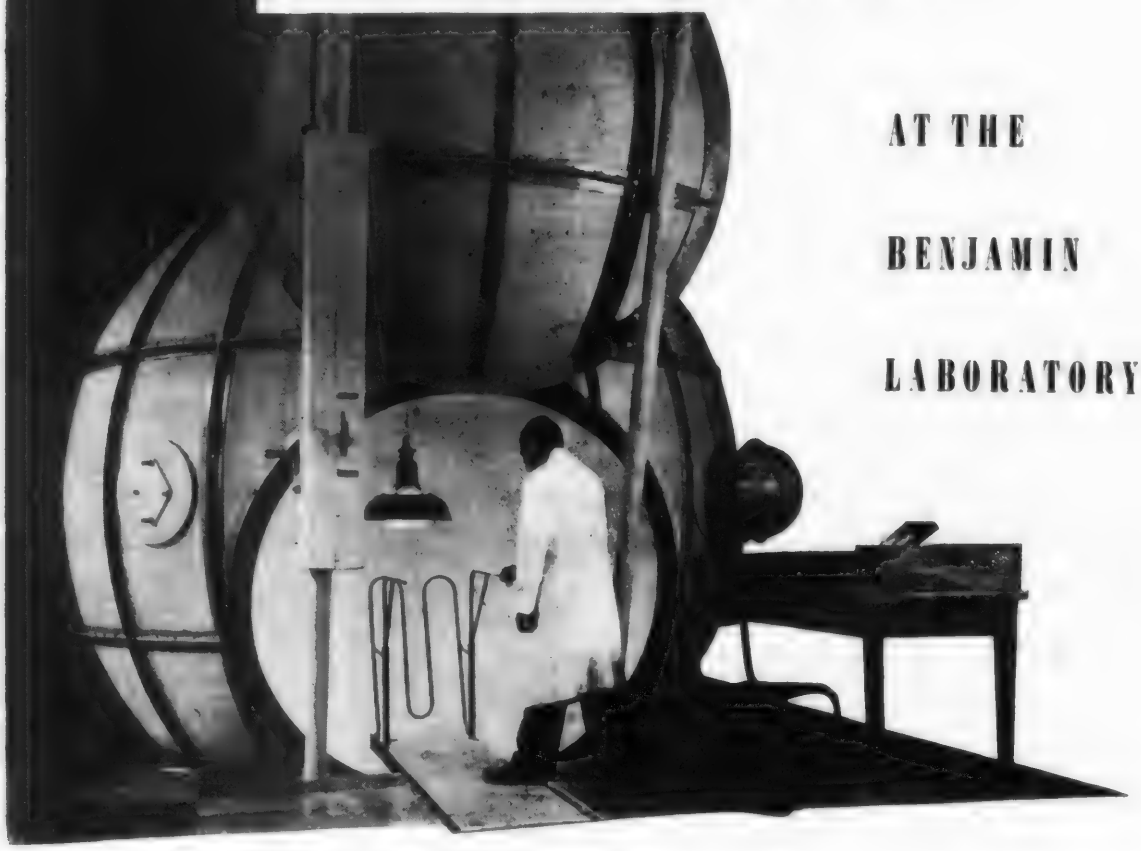
AT THE BENJAMIN LABORATORY



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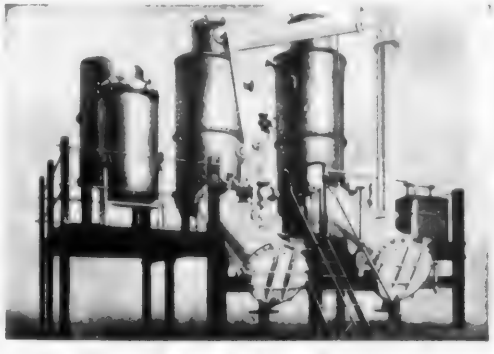
It's just as simple as that!



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DOUBLE EFFECT EVAPORATOR
WITH THERMO-COMPRESSION

The time to consult Bennetts is as soon as you see the need for any Manufacturing or Processing Plant; for we are well accustomed to considering a customer's problem and planning, designing, supplying and installing plant for individual requirements. We have been doing it since 1820, and we do it well.

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FOR CHEMICAL AND FOOD PROCESSING PLANT IN STAINLESS STEEL, COPPER, ALUMINIUM, ETC.

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How much time do you waste washing Food Utensils and the containers which hold Food products

•

These articles must be washed in large quantities *VERY QUICKLY & HYGIENICALLY AT LOW COST !*

•

Time lost in washing raises production costs and puts up the price of the product. Dawsons will be pleased to tell you how you can reduce the cost of washing. Dawson washing machines have been supplied to wash an infinite variety of articles of all shapes and sizes.

Dawson

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406 Roding Lane South, Woodford Green, Essex.
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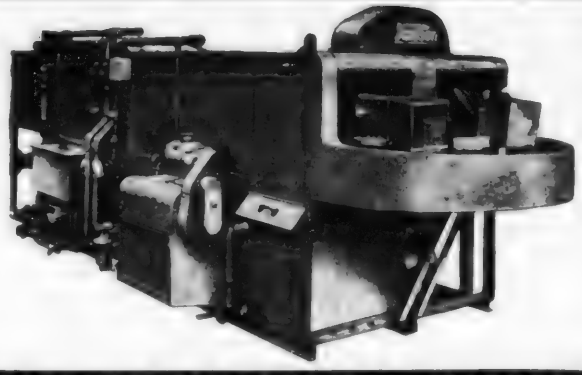
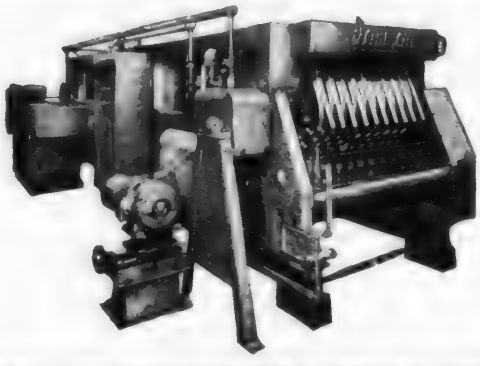
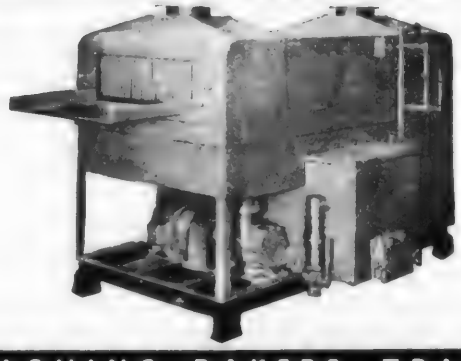


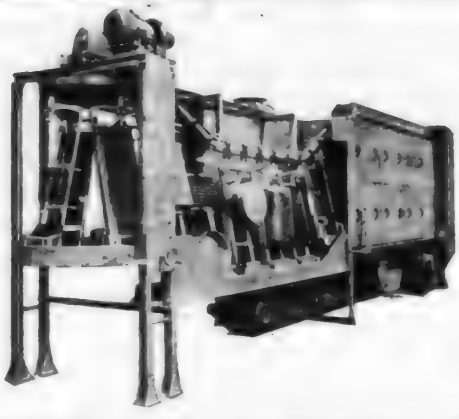
BISCUIT TIN AND CAN WASHER



WASHING BOTTLES AND JARS



WASHING BAKERS TRAYS



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- B · P · C · · ·

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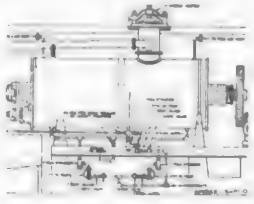

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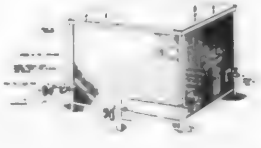

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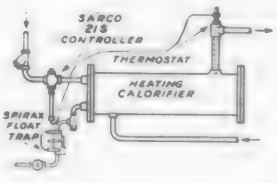

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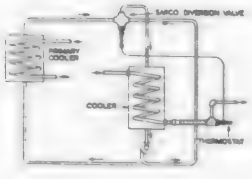

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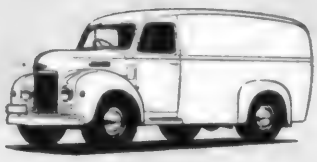
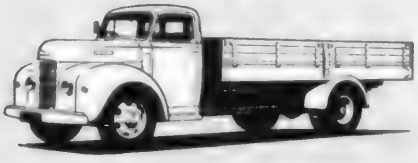
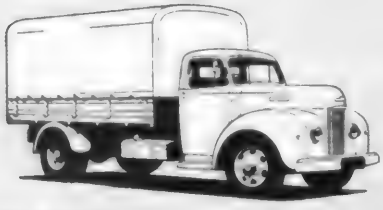


5 TON DROPSIDER





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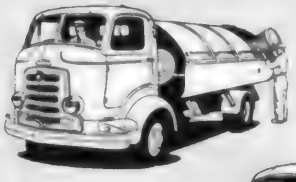

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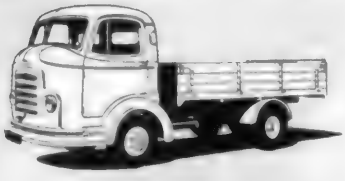

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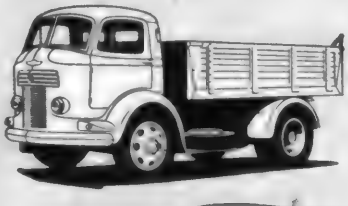

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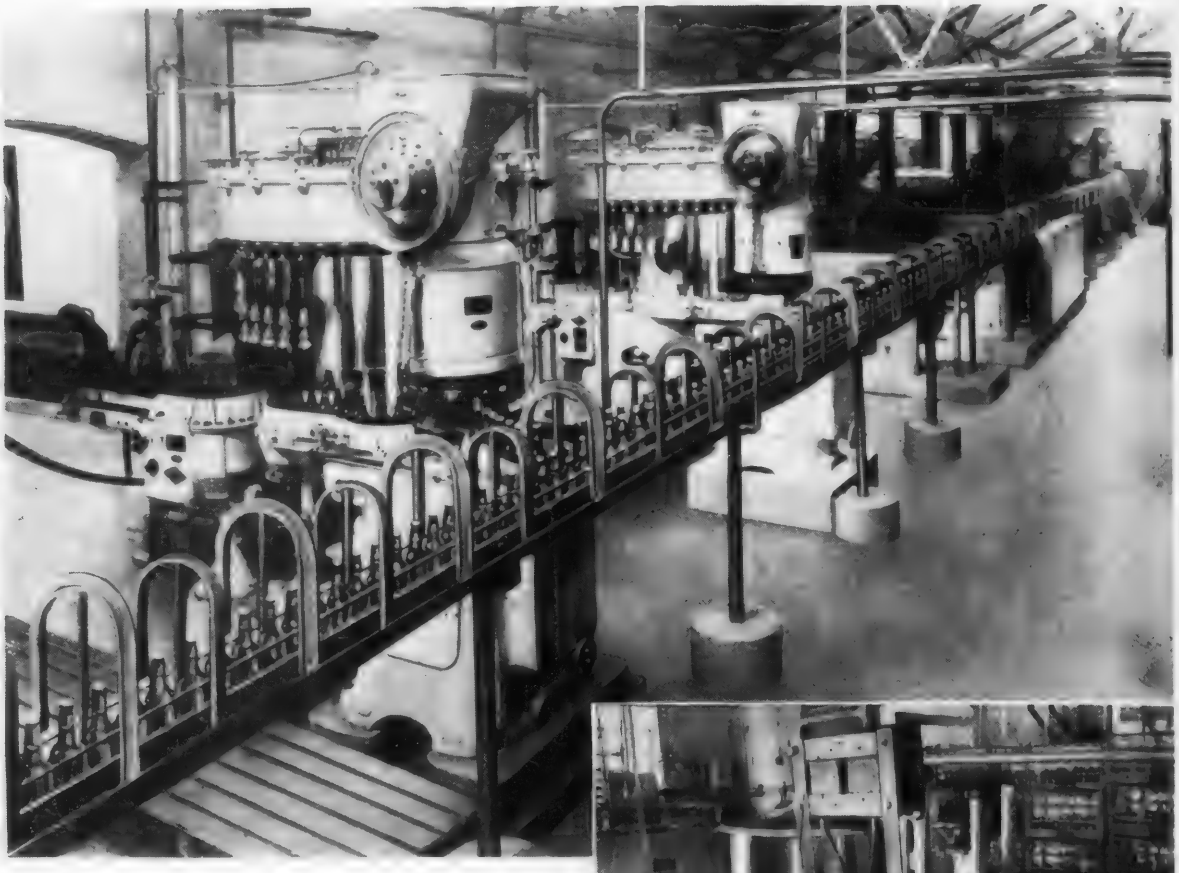

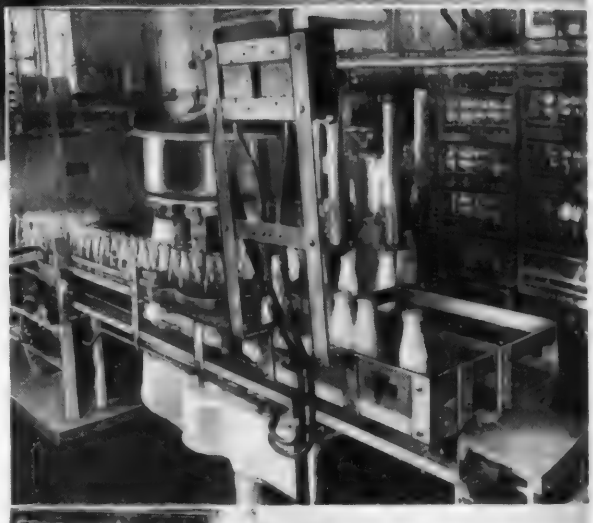

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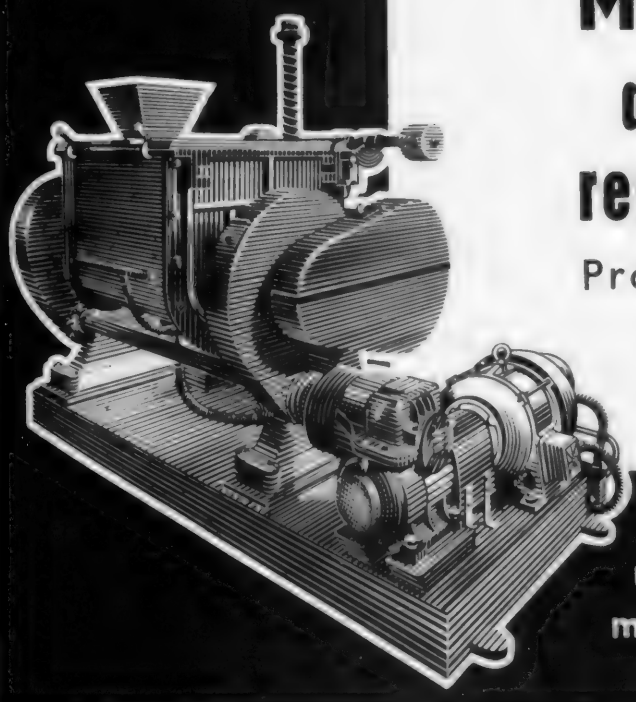

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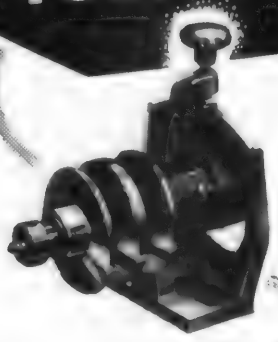

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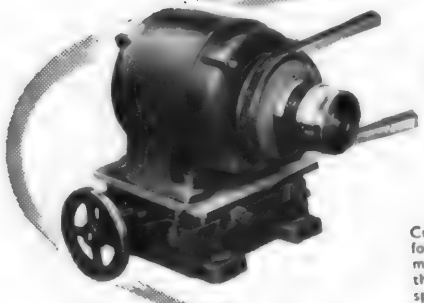

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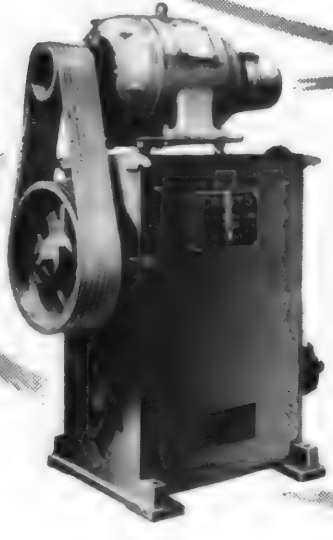

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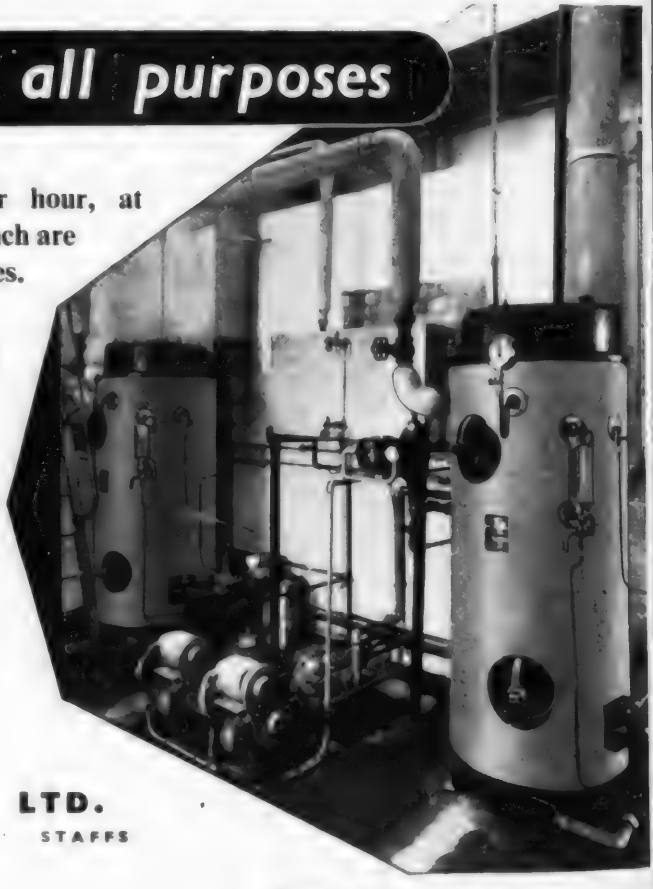

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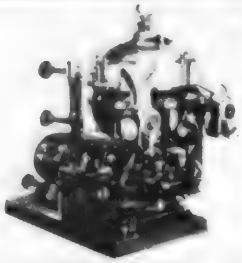

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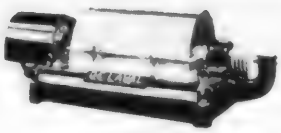

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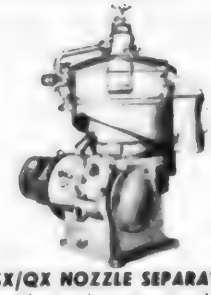

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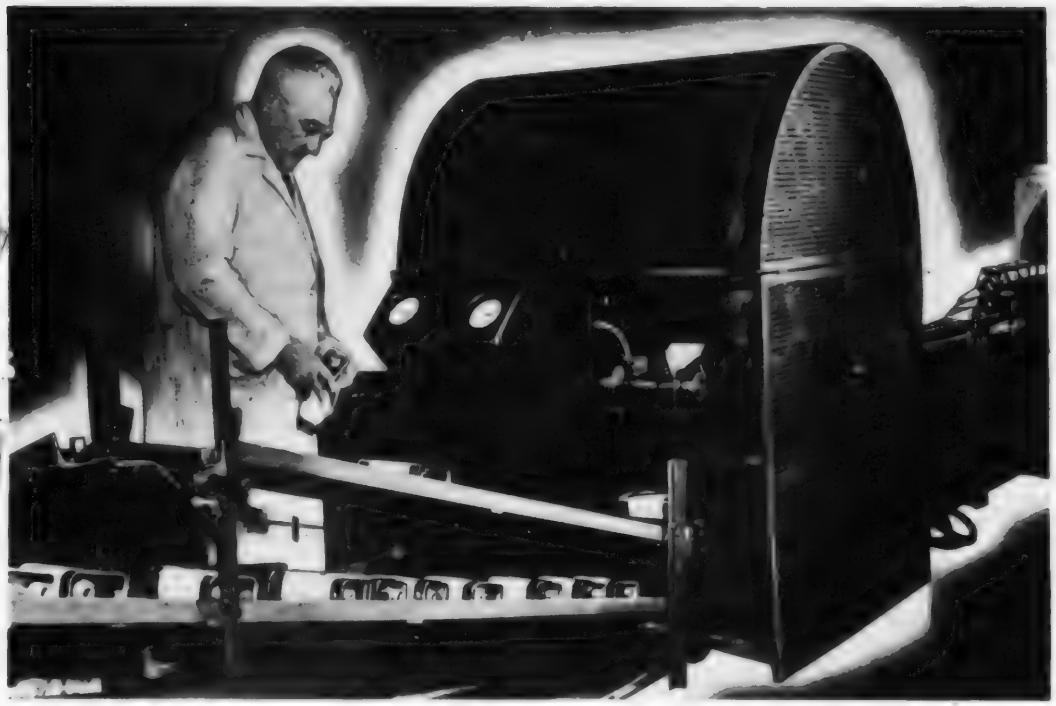

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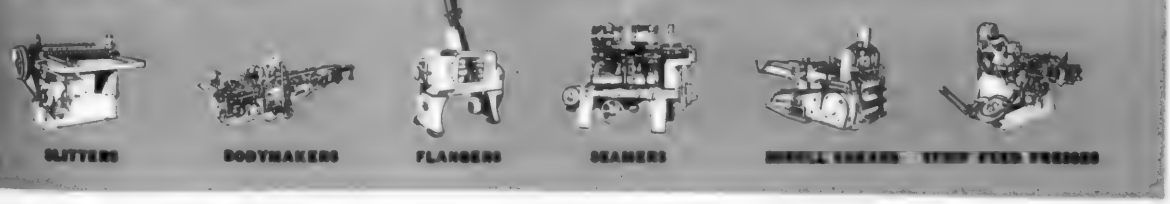

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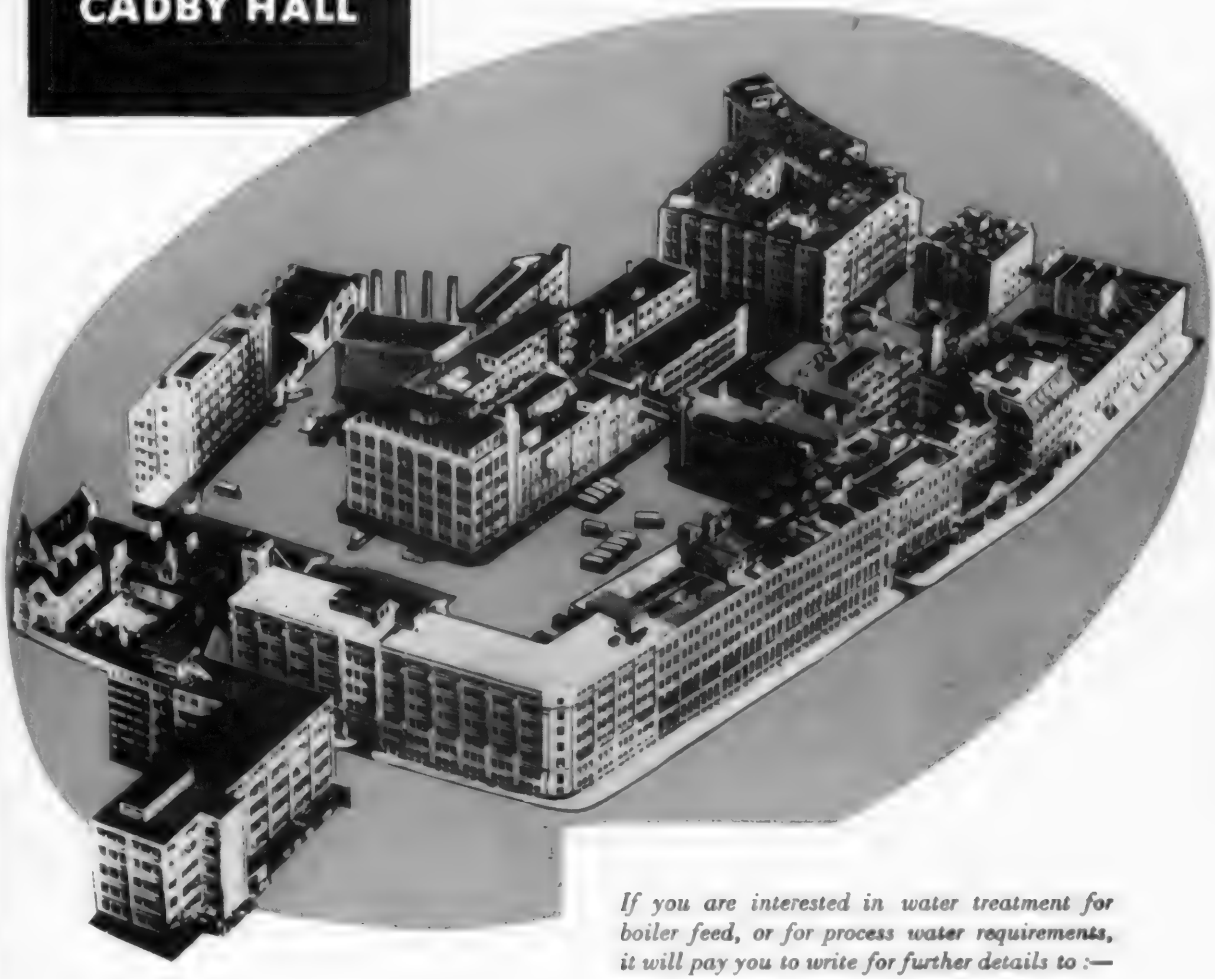

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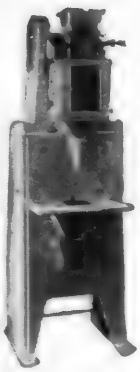

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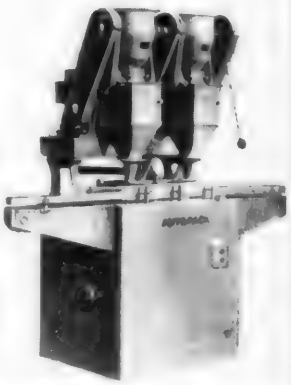

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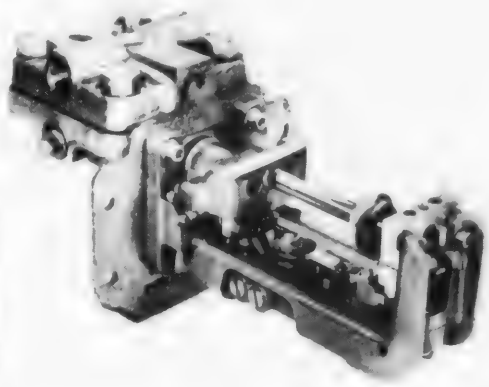

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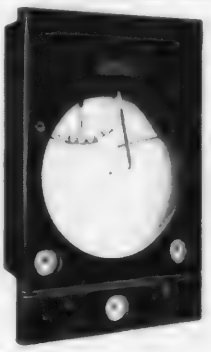
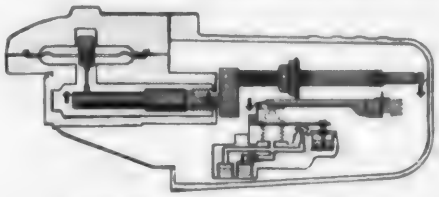


The Brown Differential Converter, a mercuryless type of manometer, operates on the pneumatic-balance principle. It converts differential pressure at the orifice into a proportionate output air pressure which, by means of a pneumatic receiver, is translated directly into terms of flow or differential pressure. Brown Pneumatic Receivers can be supplied either in the form of single, two- or three-pen recorders or single or two-pen recording controllers. These new British Made instruments set a standard of sensitivity and precision hitherto unachieved in the measurement and control of flow. *Further details are available upon request.*



Functional schematic cross-section of the Brown Differential Converter . . . showing its utilization of the pneumatic-balance principle.

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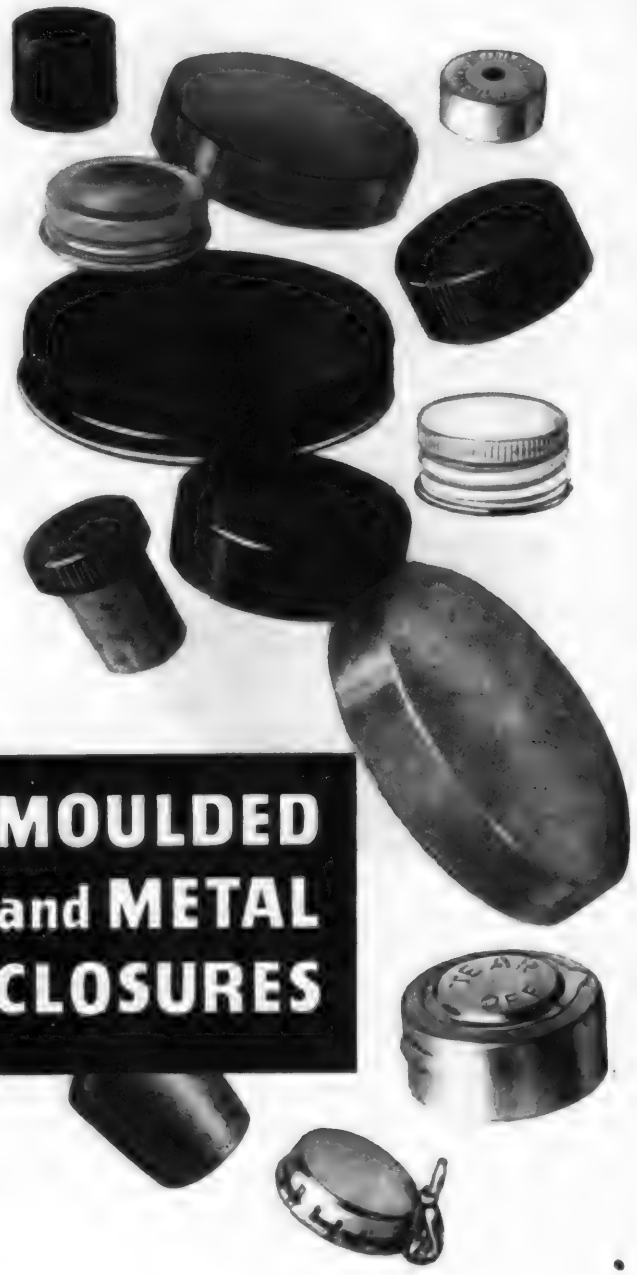

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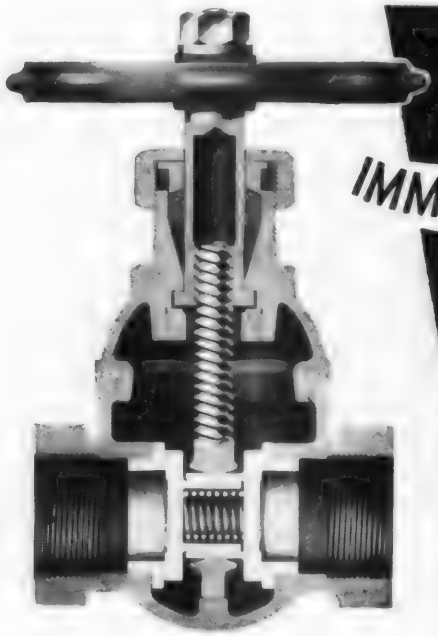

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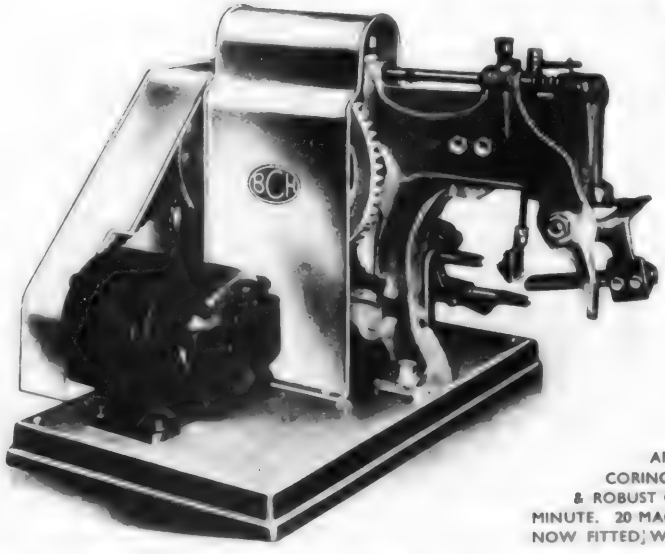

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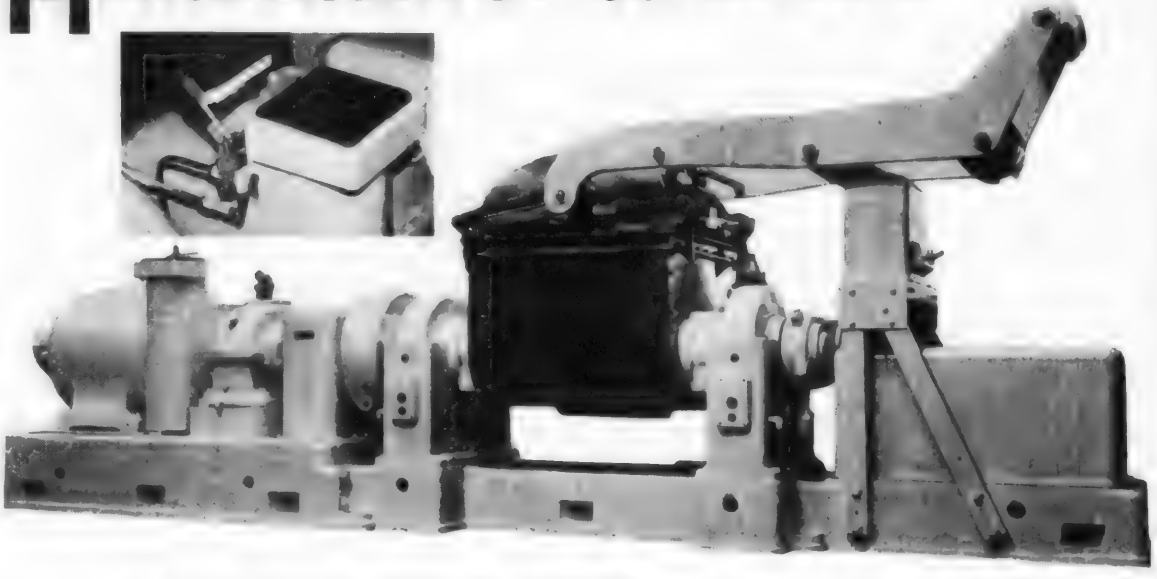

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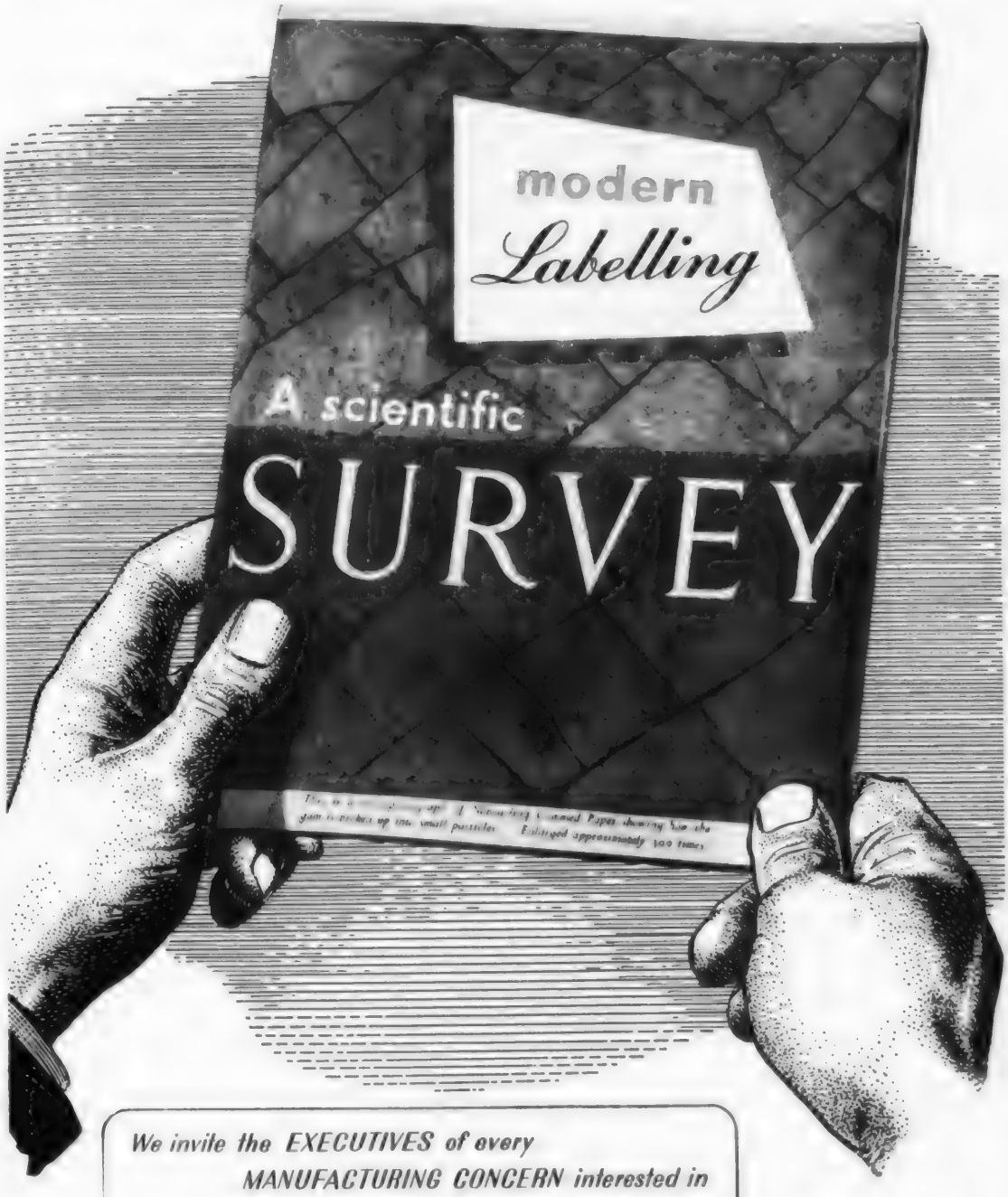

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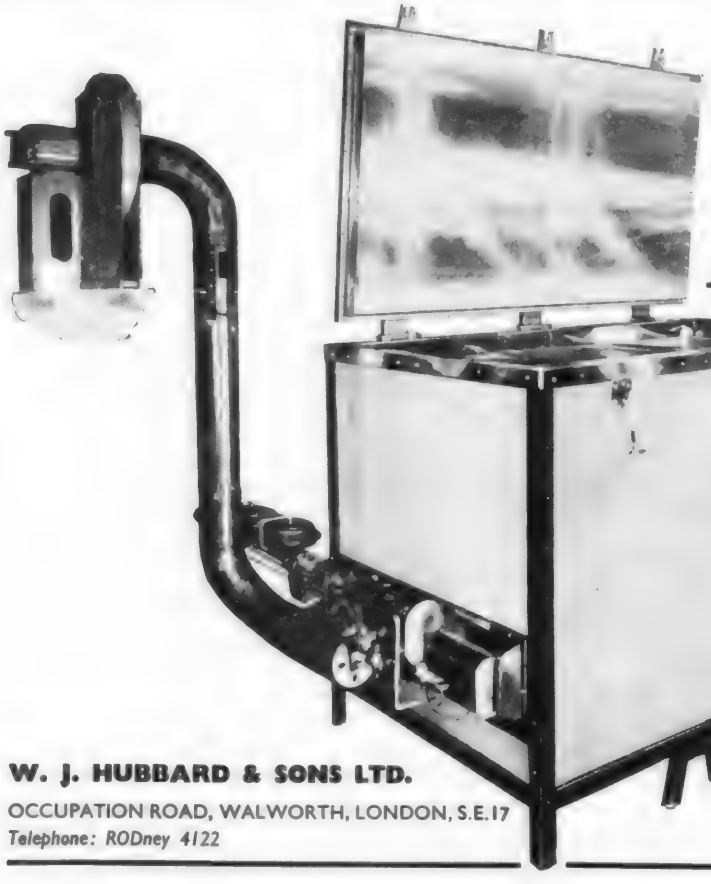

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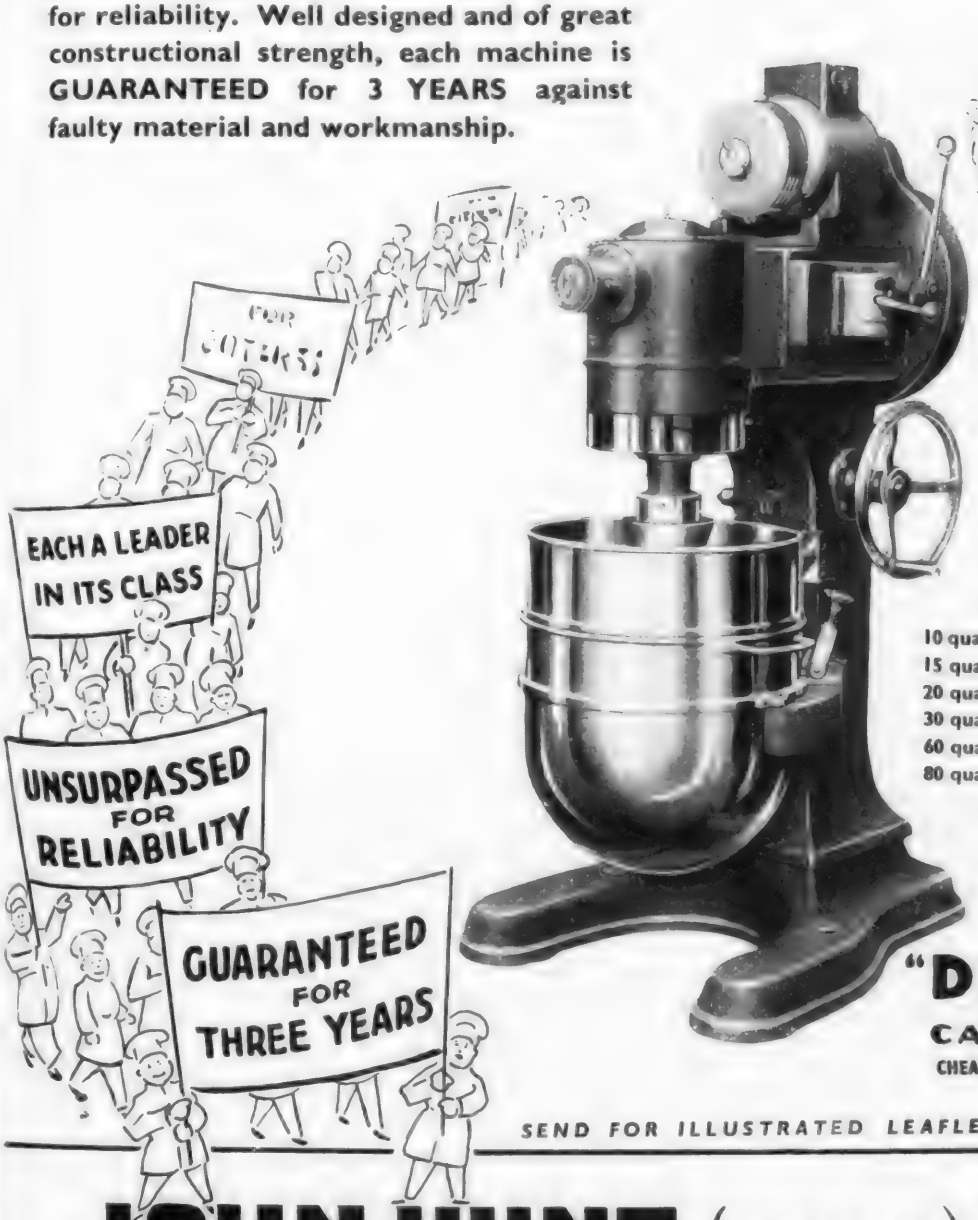

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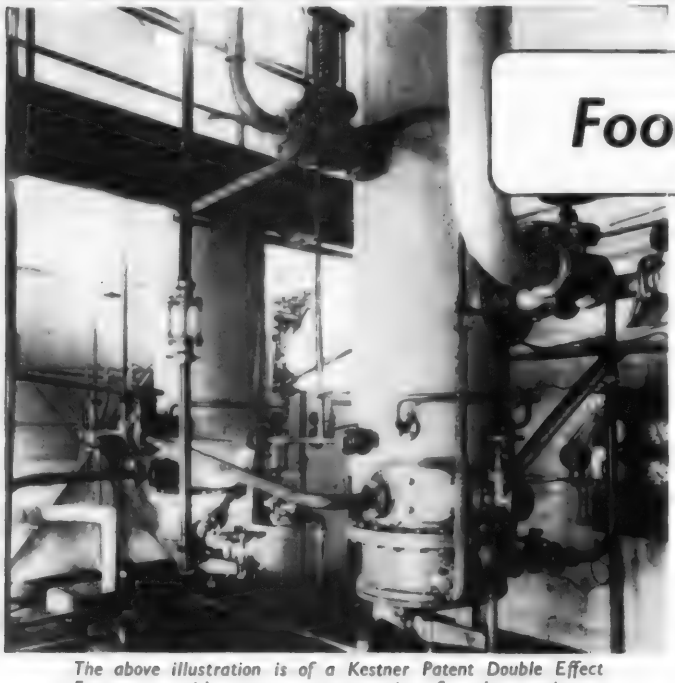

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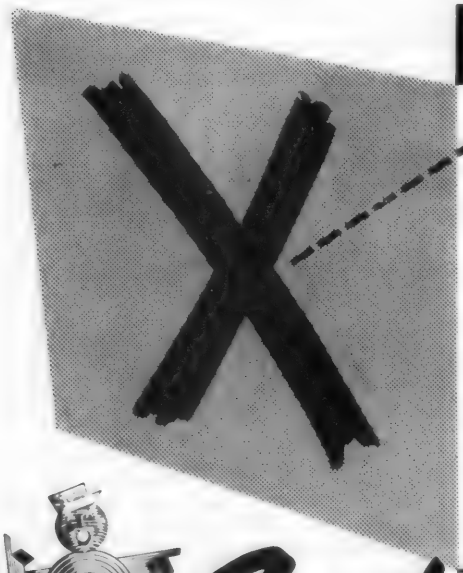

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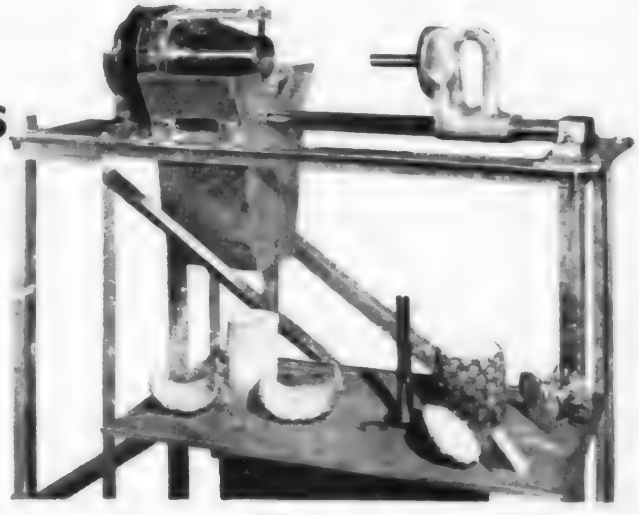

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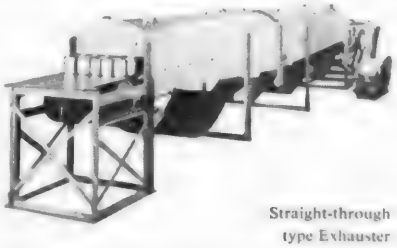

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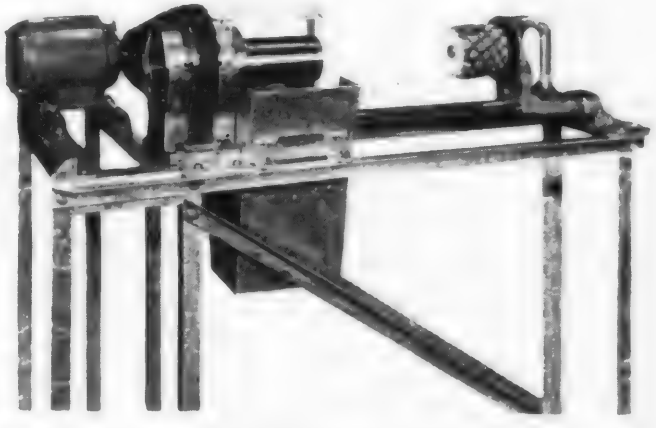

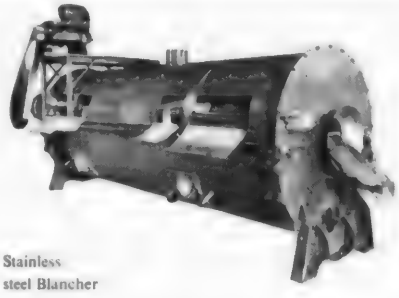

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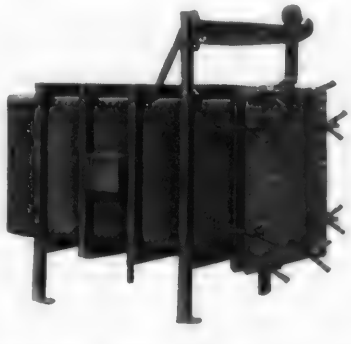

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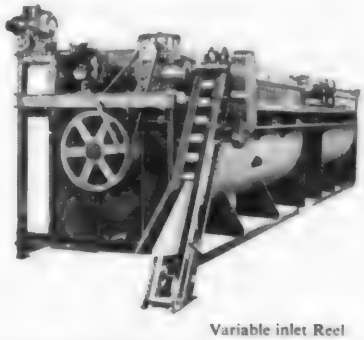

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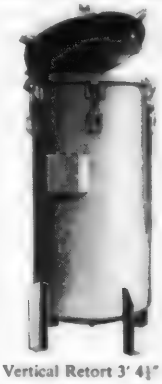

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FOOD MANUFACTURE

Vol. XXIX. No. 3 · Published Monthly · March 1, 1954

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in tins, cans and drums it's

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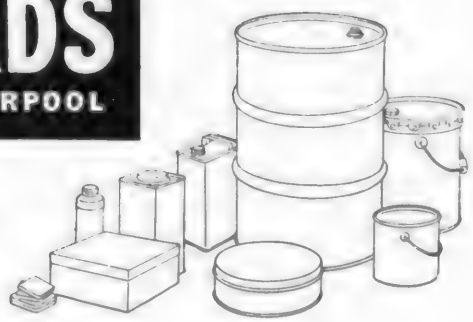

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FOOD MANUFACTURE

Vol. XXIX, No. 3 March 1, 1954

Dirty Food

AS the narrator declared in his preamble, the broadcast on the Home Service entitled "It's in Your Hands—A Report to the People on Dirty Food" was not very pleasant hearing.

There was a big "cast," the main roles being taken by three B.B.C. reporters, with interpolations by medical officers of health, sanitary inspectors, public house keepers, restaurateurs, shopkeepers, and Mr. Morley Parry, Food Hygiene Officer of the Ministry of Food, who summed up.

The three reporters set out for a fortnight's investigation of three aspects of the food industry: (i) slaughterhouses and transport of meat, (ii) restaurants, hotels, cafés, shops, markets, public houses, and canteens, and (iii) administration of present laws by precept and example.

Among the cases examined there emerged a notable contrast between the larger and smaller concerns, for instance between the immaculate Guildford slaughterhouse and some smaller ones filthy almost beyond belief. In the second category, the reporter visited 150 establishments, his final impression being that it was a "pretty horrifying fortnight."

Most of the food shops visited sinned in some way or another against clean food regulations and, of the establishments inspected in the category named, more were filthy than clean. There were recorded some interesting conversations between the visitor and the owners, who, when challenged, mostly adopted a *tu quoque* attitude. "The customers are filthy in shops; dogs (and even babies!) pollute them and spread germs."

The repercussions of the new Food and Drug Bill were discussed by the third contributor with sanitary inspectors and others. The point was raised that the compulsory registration of *all* food premises, which was one of the most important innovations so far as could be judged from the Bill in its present form, was going to be unconditional—that is to say, registration without prior inspection to ensure that they were up to standard. To this point, a sanitary inspector replied that if registration were refused on these grounds, it would put a lot of people out of business, and that was the last thing it was desired to do. This apparently means to say that the consumer must be exposed to the risk of poisoning on compassionate grounds! Unless the number of registrations refused were large (and this is an important point), it would hardly result in a famine.

The foregoing constitutes a very brief and incomplete account of a well-produced and stimulating programme. The main thesis is indicated by the title "It's in Your Hands"—which means the ordinary consumer. It is a hard row to hoe—to make dirty people clean!

Continuous Processing for Honey

CANADA can claim to be the first country in the world to develop a continuous plant for the pasteurisation and filtration of honey. Hitherto, batch-type plants, usually converted or modified dairy pasteurisers, have dominated commercial honey processing.

Although pasteurisation is necessary in large scale honey packing owing to the presence of yeasts, the heat treatment has other advantages. For example, re-crystallisation is delayed by as long as 18 months, and the task of filtration is eased if carried out at about 170°F. On the other hand, if heat treatment is not accurately controlled, it can lead to serious losses in aroma, flavour, and appearance.

The principal feature of the new Canadian process is its reliance upon rapid heat transfer for both heating and cooling. This is achieved by pre-warming the honey and allowing it to flow through small annular passages in the pasteurising and cooling sections. Heat transfer for both operations takes place through a maximum thickness of one-tenth of an inch of honey. Filtration is carried out while the honey is at maximum temperature, and little pressure is built up with a fine-mesh type of horizontal plate filter. Nevertheless, prolonged heating is avoided, as the time for filtering is included in the time required for pasteurisation.

A plant with an output of 300 lb. per hour is already operating satisfactorily at the Ontario Agricultural College, and commercial plants, with capacities of 1,500 lb. per hour or more, are visualised. As Canadian honey processors pack from 10 to 20 million pounds of honey every year, the innovation of continuous processing could well be revolutionary; costs should be significantly lowered, and the quality of the product improved. That Canada should be first in this field is another sign of the remarkable speed of the expansion of her technological skill and resources in recent years.

Ireland's Dead Meat Industry

THE leader of the Labour party in the Irish Chamber of Deputies, Mr. Norton, recently declared that not one of the 40 meat packing plants in Ireland's 26 southern counties was operating up to a quarter of its capacity, most of them having had to cease production altogether.

A leader writer in the *Irish Times* asks: "Why has it languished? There must be reasons, and these reasons call for an airing. Have the British, our principal market for dead as for live meat, discriminated against it? Have the farmers demanded excessive prices from the factories? Have the administrators of the livestock industry, as has been suggested, been able in some subtle way to create conditions unfavourable to the export of dead meat? It is important to know.

"It may be that the industry developed too fast. The supply may have grown too rapidly for the demand. . . . Perhaps there was not room in Eire for a dead meat industry employing 4,000 workers—not room, anyhow, in present circumstances, before the market had been fully established and an adequate demand created in Great Britain and elsewhere."

Vitaminised Bread in Germany

Two years ago, a German flour mill of medium size introduced vitaminised flour to the market, and now the opinions of German millers on the subject have been published (*Allgemeine Bäcker-Zeitung*, **8**, 42, 3).

One critic in the milling industry points out that bread is not the only source of vitamins or even of vitamin B_1, and that dietitians do not normally consider bread to be an important vitamin source. He states that the last recorded case of beri-beri in Western Germany was in the year 1880. As the people's diet contains enough vitamins in other forms, it does not appear desirable to convert bread flour into a sort of universal domestic remedy against ills.

Another critic, while admitting the incidence of avitaminosis through under-nourishment (instancing Spain in the Civil War, the fishing population of Newfoundland, and a case in the Philippines), points out that the normal German diet of bread and potatoes should already provide vitamin B_1 in sufficient quantities.

The suggestion that vitamin B_1 intake has to be derived solely from bread does not appear sound, and is probably a survival from the days of enforced rationing of nearly all foods.

Before adopting any sweeping policy of artificial vitaminisation, German millers are of the opinion that proof would be required that a deficiency of vitamins is in fact present in the ordinary diet of the people and that there is no other way of combating it. Admittedly, Newfoundland fishermen, apparently living on devitaminised white flour and canned foods, may have benefited from vitaminised flour and margarine, but that hardly applies in Germany.

If attention were to be directed to products entirely devoid of vitamins, such as sweets, confectionery, pudding and custard powders, and cake mixes, which form such a large proportion of ordinary diet, and vitamins were added to these, some benefit might accrue.

A German research chemist, who investigated what happened to the vitamin after it had been added to the flour, found that 10 per cent. is lost in bleaching and "improving" the flour; 25 per cent. may be lost during long storage; 3 to 25 per cent. (sour dough, *e.g. pumpernickel*) lost in making the dough; and in the final baking, from 10 per cent. for wholemeal rye to 60 per cent. for fancy bread, cakes, and biscuits. In any case, 60 per cent. is lost between the mill and the consumer, and vitaminisation as a means of compensating dietetic deficiencies hardly appears worth the effort.

Instead of embarking on costly schemes of adding vitamins to flour and bread from which most of the additions will be lost again, the general opinion of the German millers was that food scientists and pharmacologists should try to find ways and means of administering vitamin B_1 in such a way as to give the user the full benefit of the intake.

New Check on Pasteurisation

As extensive users of pasteuriser-coolers, the Blitz Weinhard Co. Brewery, of Portland, Oregon, have hit upon the idea of replacing the conventional method of temperature control, which consisted of sending a self-contained recording instrument among the cans or bottles, by a more positive method that would give the temperature inside the cans or bottles, rather than in the pasteuriser itself.

A "travelling thermocouple" system was devised by which a thermocouple is inserted in the can or bottle, and the container sent through the pasteuriser. The internal temperature is recorded on a continuous strip chart in the office of the bottle shop supervisor. Leads to the thermocouple are carried along above the bottle by a slotted tube which extends along the length of the pasteuriser.

A ball joint runs inside the tube with a swivel joint extending downward through the slot. This serves as a moving hanger for the thermocouple wire as the container travels forward. When the bottle or can emerges from the cooler, the thermocouple lead is removed, and hooked to the swivel joint. It is drawn back through the pasteuriser, and immediately inserted in another container. By this method, instead of recording the temperatures of the heating and cooling medium surrounding the bottles and cans, a continuous record of the temperature of their con-

tents is maintained. In addition, the supervisor has a record of the time at which temperature fluctuations have occurred, corrective measures thus being pinpointed.

Maintenance is reduced, since the possibility of jolts and jars causing damage to sensitive recording mechanism is eliminated; the only thing which travels is the rugged sensing element.

Filtration-extraction of Oilseeds

A NEW process of direct solvent extraction for oilseeds, called filtration-extraction, has gone into commercial use in a Mississippi mill. Rated daily capacities with cottonseed will be 150 tons and with soya beans 75 tons.

Developed through the pilot plant stage at the Southern Regional Research Laboratory of the Bureau of Agricultural and Industrial Chemistry, U.S. Department of Agriculture, the new process is claimed to be readily adaptable for quick conversion from one oilseed material to another, no pre-pressing being required. Filtration-extraction may make it possible for smaller mills to apply solvent extraction because installations appear to be feasible with rated daily capacities as low as 75 tons for cottonseed, in contrast to the usual daily range of 150 to 400 tons found in other solvent plants.

Filtration-extraction departs from conventional methods in the preparation of the material after delintering and dehulling, as well as in the extraction phase. The rolled flakes are cooked, cooled, and then "crisped" by evaporation. Almost all the preparation equipment in hydraulic mills is used in filtration-extraction, with only minor changes.

After the preparation of the meats, the oil is brought into solution in a mixing vessel, and the oil solution (miscella) is removed in a standard continuous, horizontal, vacuum filter. These two units replace the extractor and the presses of other solvent methods. Properly prepared material is soaked in the mixing vessel in contact with miscella for 15 to 25 minutes to dissolve the oil. Then the slurry of meal in concentrated miscella (about 30 per cent. oil) is fed to the filter, where it is filtered off and the meal is counter-currently washed and successively drained three times—in less than three minutes. The residual oil in the extracted meal (marc) is 1 per cent. or less.

While the use of a horizontal vacuum filter to conduct counter-current washing is not a radical application, the premixing or slurrying step in a separate vessel followed by counter-currently washing on the filter, and the method of preparation which makes these combined steps possible, are recognised as an innovation in the technology of oilseeds extraction.

The vacuum drainage before and after each wash on the filter results in a lower solvent content of both extracted meal and final miscella, and allows a lower solvent-to-meats ratio, lower steam costs, and the use of smaller equipment than with conventional processes. These features result also in a high production capacity for a small-sized filter unit.

The Southern Regional Research Laboratory, in co-operation with oilseed processors, is continuing pilot plant operations with various other oil-bearing materials, to understand better the principles and variables involved in the preparation and extraction phases, to determine the different conditions required for the different materials, and to improve the general processes and product quality. Their findings will be awaited with interest.

Consumer Response to Food Products

ACTIVE interest is being evinced in the U.S.A. in "food acceptance methodology," as was recently evidenced by the calling of a special meeting for its discussion, sponsored by the Advisory Board on U.S. Quartermaster Research and Development of the National Research Council, National Academy of Sciences. The terms of reference were the need for adequate methods for flavour evaluation, for the measurement of consumer preference, and for measuring attitudes towards foods in order to predict the food acceptance behaviour of the consumer.

For the study of the practical aspects of the new field of sensory testing of food products, trained panels of tasters have been employed in evaluating the acceptability of many new items before they are offered for sale. The panel technique has been successfully applied to the determination of off-flavours, the detection of contamination of foods, the comparison between food products on the market, and the formulation of new ones.

The "psychological aspects of consumer surveys, new methods of scaling consumer preferences, and psycho-physics" form another part of the studies.

It was considered that the work of the various laboratories should be co-ordinated and established as a distinct scientific discipline. Suggestions with a view to achieving this end included the organisation of an institute or foundation, supported by the food industry and devoted to the study of food acceptance testing methods, the launching of a new technical society and journal devoted to this field, and the integration of the new discipline into an existing organisation. For the present, the last course was favoured, and specific moves have been planned to establish a Division of Food Acceptance Testing in the Institute of Food Technology.

It is evident that interest in this matter is not a mere flash in the pan. While obviously emanating from the laboratory, it has not stayed there and has received the enthusiastic support of the food industry.

There are certain dangers attached to the psychological methods. Academic scientists may work out

methods, the statistical formulae, and the techniques followed by practical workers. The most rapid development occurs when pure and applied science work together, each enhancing the progress of the other. But traffic has been often one-way (it is this absence of a two-way traffic which has made social science, in which may be included consumer food preferences, more academic and less related to reality than it might otherwise have been), thus obstructing fruitful advances in the practical field which would have followed closer collaboration. This is the hurdle which must be negotiated, but judging from the information available from the U.S.A., they are going the right way about it.

Cabbage Juice in Capsules

IT is usual to consider cabbage juice from the point of view of its vitamin C content, but apparently it will now have to be studied from another angle. It appears to be rich in an unidentified factor, at present designated vitamin U, which is claimed to be of great value in the treatment of peptic ulcers.

At the Stanford School of Medicine in the U.S.A., ulcer patients have for some time been put on a diet of a quart of cabbage juice per day. The ulcer craters and scars have generally healed up in about a fortnight, pain disappearing sooner.

This development has now been taken a stage further by the production of a cabbage juice concentrate. With the reduced intake of liquid, patients were able to enjoy an unrestricted diet of other foods during the treatment.

A third stage of development is now being tested. The American firm, Merck and Co., have dehydrated the concentrate and put it up in capsule form, with the hope that the capsules will be no less effective than the liquid concentrate.

The previous treatment involved the use of drugs and a very restricted diet lasting 50 days to take effect—cabbage juice by pill rather than the pint for 14 days is certainly more attractive.

Water in Chicken Paste

KENILWORTH magistrates recently imposed a fine of £25 on a Newcastle on Tyne food manufacturer, summoned by Warwickshire County Council for contravening the Defence (Sale of Food) Regulations. The defendant pleaded guilty to supplying minced chicken bearing a label calculated to mislead as to the substance of the food, in that the label described the product as 100 per cent. chicken with flavouring.

For the prosecution it was stated that food authorities throughout the country were watching the case with considerable interest as, although the matter concerned only three small jars of paste, the principles involved were important.

It was stated that the chief sampling officer, Mr. J. S. Preston, had bought from the defendant minced chicken paste bearing a label stating it to be 100 per cent. chicken. On analysis it was found that the product contained 30 per cent. water. Mr. Preston visited the Newcastle works and found that water was being added "to make the contents easier to press into jars."

Chairman of the Bench, Mrs. G. Mills, said that the Bench did not think the firm had any intention to mislead but the regulations should have been studied more carefuly.

Protecting Foods from U.V. Light

FOODSTUFFS displayed in shop windows—chocolates, for example—rapidly deteriorate in appearance, owing to the action of ultra-violet rays through the window glass.

It has been suggested that the permeability of the glass to the rays may be lessened by the use of a transparent, non-discolouring lacquer capable of absorbing ultra-violet light. The absorbing ingredient could be quinine which traps the rays and possibly emits them at a longer and less harmful wave-length. Thus, to the list of uses for quinine may be added that of food protection.

Such a lacquer should find a ready sale, and its formulation should not be too difficult. Besides its use for shop windows, it might find an application in packaging for display containers holding light-sensitive products.

Dried Fruit

APRICOTS dropping gold beneath a window,
As painted by Nicholas Maes,
With that pensive, tawny-skinned girl leaning out above them
I have always regarded as nice.

Or birds in a monastery garden and the fruit succulent
Ripening on a sun-warmed wall;
I dearly love an apricot, dried or juicy,
And (*pace* the Duchess of Malfi) don't we all?

"Feed him with apricocks and dewberries," my Shakespeare said,
And he knew what was what.
But at three-and-threepence a pound, dried, from Turkey, you can hardly call them
A without-which-not!

TO AUTHORS

The publishers of FOOD MANUFACTURE and the other journals of the Leonard Hill Technical Group are prepared to consider the publication of articles and text-books on their various subjects.

Wafer Goods for the Ice Cream Industry

In 1910 Lawrence Askey, baker and inventor, acquired small premises in Kensal Road, London, W.10, for the manufacture of wafer goods. Today, 44 years since its foundation, the Askey organisation has factories in Scotland, Ireland, and South Africa, while the London factory has spread far beyond the bounds of its original site.

THE intake of raw materials to the Kensal Road factory bears a significant resemblance to that of a cake factory, both in its type and variety. The cone and the wafer have long since left behind the "flour and water" conception of the earliest days. Eggs, milk, and fats are now used in such appreciable quantities as to warrant the new description of the "cake" cone, a product evolved by the company.

The basis of the factory's whole production is the liquid batter, containing all the customary enriching ingredients of cake. It is produced in continuous batches in the mixing room on the first floor.

Pasteurisation and Mixing

In the mixing room, two main operations are carried out. Firstly, the liquid, consisting of the reconstituted milk and egg powders, is pasteurised and passed through coolers of the dairy type, and thence to the ageing vessels.

At the mixing stage, the flour is delivered to the totally enclosed whisking machines by a sifter-elevator with the remaining dry ingredients. The pasteurised liquid is pumped in from the ageing vats, and water is added, together with emulsified fats, the actual beating operation taking about 10 minutes.

The finished batter is piped down to the ground floor where refrigerated storage vessels are variously located to serve different machines. Of varied capacity, these vessels include a number of portable units designed to hold small quantities of special mixes for particular uses, such as the provision of coloured and flavoured wafers and cones which may be specially ordered.

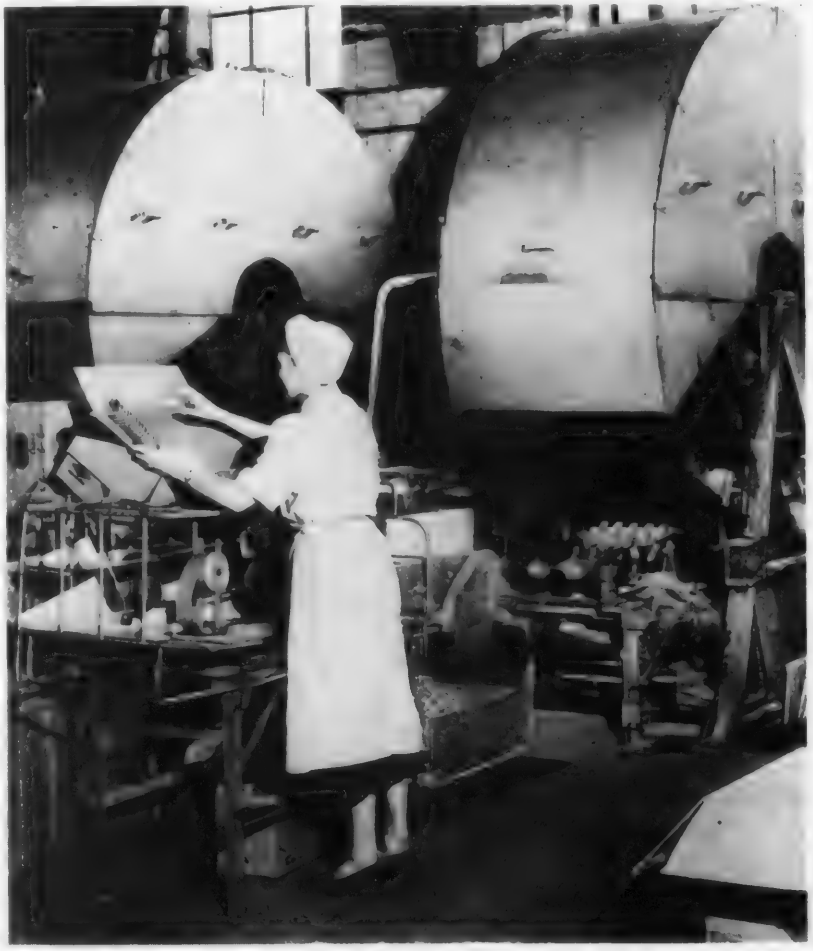
From storage, the batter is pumped to the individual baking units. Fully automatic, these machines are designed for continuous production. Under extremes of seasonal pressure, production is sometimes carried on for 24 hours a day with shift working.

Baking Methods

Two methods are in operation for the baking of cones, and data are being collated to determine the type best suited to the needs of future standardisation of the plant. The principle in each case is the same, but operational methods and machine design differ.

The battery of American-type machines stands along one side of the production department. At intervals around the perimeter of each slowly revolving wheel or cage, transverse members carry sets of dies and moulds. Gas jets, set upon an internal framework, play upon the dies and moulds continuously during their circle of travel. As they near the completion of the circle, the dies are withdrawn from the moulds, which are tripped and inverted to release the baked cones.

The cones are now guided beneath a trimming press for the removal of the rough upper edge, whereupon the finished cone falls



Part of the battery of American-type machines used for the manufacture of cones.

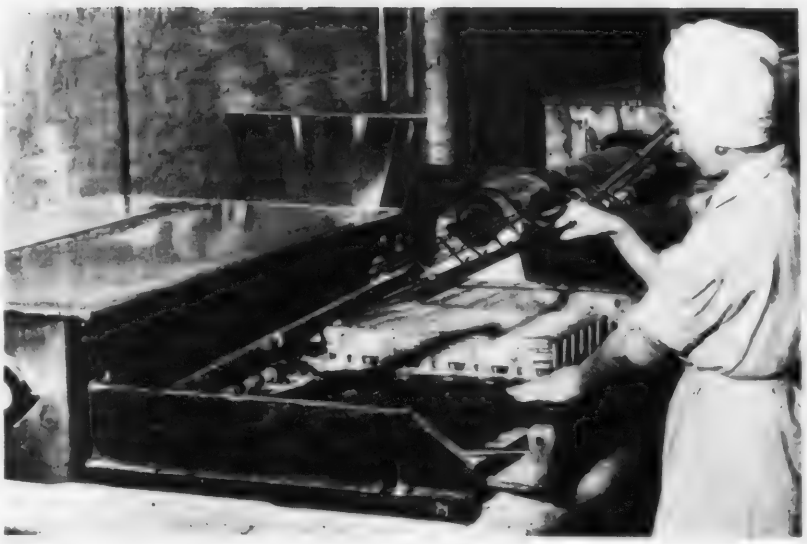
Above: **The cones are packed into stacks for preliminary cooling prior to packaging.** *Below:* **The wafer frames leave the ovens at a level lower than that at which they enter.**

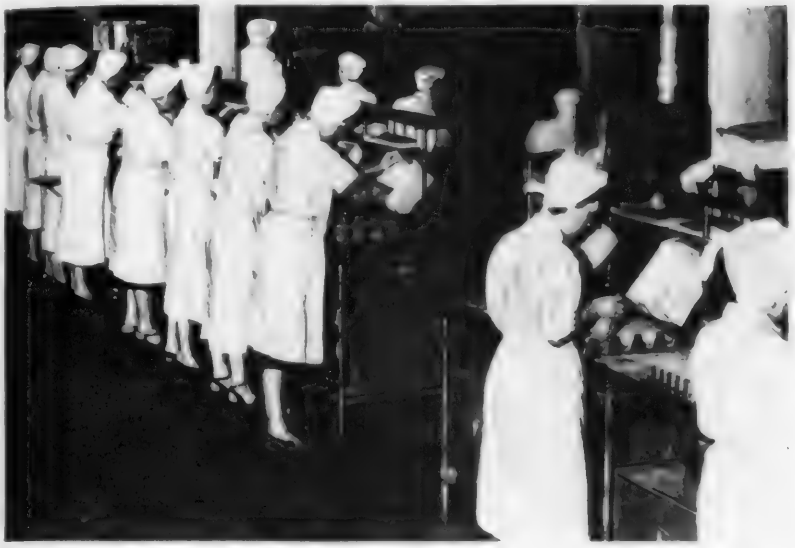
through the press on to a conveyor belt, on which the cones are packed into stacks for preliminary cooling prior to packaging.

Meanwhile the moulds revert to their vertical position, and as they pass beneath filled nozzles a measured quantity of batter is deposited, and the die clamps down once more.

The British-type machines, occupying the opposite wall of the production department, employ a large, circular, revolving table instead of the "big wheel" principle, being otherwise similar in action to the American units.

An ingenious feature in the manufacture of the modern ice cream cone is the nesting ring.





Above: **The frames reach the cutting machine from which the cut wafers pass along to the packaging department where they are packed in almost any denomination from pairs upwards** (*left*).

This is moulded into the shape of the cone, thus ensuring that the cones travel without the breakages previously involved by telescoping during transit. A further advantage of this device is the guarantee which it gives of a standard count in each row of cones.

The mechanisation of the Askey factories has produced complications not ordinarily met with. The number of users of such specialised machinery being small, only a limited range of standardised machines is available. Machinery manufacture tends, therefore, to follow individualistic lines incorporating various refinements worked out by the firms concerned. This is particularly true in the case of the Askey organisation.

Wafer Manufacture

The manufacture of wafers is carried out in travelling ovens fitted with sets of heating irons on a travelling chain conveyor. The heating iron, which is about 15 inches wide by about 24 inches in length, consists of a base with a hinged lid. It assumes a horizontal position with the lid open, immediately before entering the oven, and at this stage thin lines of batter are deposited on to the base. The top then clamps down into position and the whole block enters the oven in which direct gas flames play upon both the top and bottom of the unit throughout the duration of its travel.

The wafer frames leave the ovens at a level lower than that at which they enter, opening as they do so. The wafer sheets are then removed by a girl who stacks a given number of sheets into a frame, each of which, on filling, travels to the saw bench.

Here the frame is slipped between guides by the girl operator who, with a simple hand movement, pushes the guide frame beneath the guarded saws, then withdraws it. The frame is next turned round on the operating table and passed sideways beneath another set of guides on the same machine for the transverse cut. The frame, filled with cut wafers,

"The proof of the pudding . . ."

passes along to the packaging machines.

The wafers may be packed in almost any denomination, from pairs upwards, the twin-pack being popular for café use. From this point, the packets of wafers pass to be packed in tins which, when filled, move along to the labelling and sealing section, and thus to the despatch department.

Products of the Company

Fourteen different types of biscuit cone are made by the company, the latest being the Punch cone intended to take standard size ice cream bricks.

Cream-filled wafer biscuits are among the various lines manufactured by the company, and chocolate enrobing is also carried out. Another type is the wafer baking cup, much in demand by the baking trade. To cover the bulk of the business in these lines, special plant has been set up at Airdrie, in Scotland.

The decontrol of cereals eased one of the company's problems, for National flour was unsuitable for wafer biscuit production. The company always received an allocation of Australian flour, but the extending of this with National flour led to frequent difficulties.

The quantities of trimmings and wastage from the wafer-sawing plant and cone-trimming machines are processed for animal feeding-stuffs.

SUPPLIERS OF EQUIPMENT

Wafer biscuit machinery: *T. and T. Vicars.*
Gas compressors: *Keith Blackman and Co.*
Mixers: *Morton Machine Co.; William Farrer and Co.*
Grinding machinery: *Harrison Carter and Co.*
Refrigeration: *L. Sterne and Co.*
Cooling equipment: *Pulsometer Engineering Co.*
Stainless steel vats: *A. Johnson and Co. (London).*
Bedford vans: *Vauxhall Motors.*
Diesel-engined vans: *Seddon.*
Cases: *Containers Ltd.; Thompson and Norris Manufacturing Co.*
Tins: *Huntley, Boorne and Stevens.*
Tin washing plant: *Robert Kellie and Sons.*
Stitching machinery: *Packers.*
Internal telephone: *Automatic Telephone Co.*
Office equipment: *Remington Rand; Burroughs.*

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Food and the Japanese Surrender

"DETERIORATION in the quantity and quality of the Japanese diet and the precarious outlook for the maintenance of food rationing appear to have weighed heavily in the decision of the government to surrender in August, 1945," says Mr. Bruce F. Johnston, in his account* of the impact of World War II on Japan's food supply, and of the steps taken by her government in attempting to cope with the problems created by wartime conditions.

Mr. Bruce Johnston is an agricultural economist with the food and agriculture division of the Office of the U.S. Special Representative in Europe. He served from 1946 to 1948 as chief of the Food Branch, Price Control and Rationing Division, of the Economic and Scientific Section of General Headquarters of the Supreme Commander for the Allied Powers (SCAP).

In 1947, when wartime systems of food rationing and collection were still operative, the Food Research Institute at Stanford University made arrangements for him to take major responsibility for the manuscript.

Mr. Mosaburo Hosoda, chief of the archives section of the Japanese Ministry of Agriculture and Forestry, and Mr. Yoshio Kusumi, former vice-minister of Agriculture and Forestry and now a member of the Committee of the House of Councillors, consented to collaborate with Mr. Johnston. Their intimate knowledge of the wartime measures related to food production, collections, rationing, and imports, based on their personal experience, contributed much to the book.

Introductory chapters describe the pre-war conditions of agriculture, trade, and domestic food consumption upon which the wartime experience was superimposed. One of the major importing countries of the world, Japan with her total land area of 142,000 square miles could not begin to produce enough to feed her population, already numbering 73 million at the end of 1941.

Careful consideration is given to the pre-war diet and trends in the consumption of major foodstuffs, and to the nature of these imports, their position in foreign trade, government trade policies, and the development of the Japanese colonies as primary sources of food supply.

In the course of World War II, the Japanese government took many measures to maintain domestic production and the flow of food imports, and to control the distribution of supplies. But enormous shipping losses and the steady tightening of the Allied blockade gradually brought the importation of food to a virtual standstill during the final weeks of the war.

Mr. Johnston analyses the wartime food programme, the specific measures taken, and how shortages of fertiliser, labour, and farm implements, and declines in livestock production and the fish catch affected the Japanese diet and the whole wartime economy.

After the surrender, "the continued food shortage was the chief factor accounting for deterioration of the level of living below that of pre-war years." The final chapter deals with the post-war period, describing this severe food problem, when the level of imports was restricted by a world-wide grain shortage which made it impossible for food deficit countries to satisfy their import needs in full. There are also discussed the problems which Japan faces in the years ahead in trying to feed her growing population—now in excess of 85 million.

* *Japanese Food Management in World War II.* By Bruce F. Johnston. Pp. 282; xii. Stanford University Press. Price $3.50.

The Leonard Hill Technical Group

Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:

World Crops.—The Cashew Nut; Chemical Weedkillers.

Chemical & Process Engineering. Molecular Distillation.

Manufacturing Chemist. Industrial Methods of Sterilisation.

The Vitamins

Progress in 1953

F. A. Robinson, M.Sc.(Tech.), LL.B., F.R.I.C.
Allen and Hanburys Ltd., Ware, Herts.

Part 1

No spectacular discovery has been made recently in the vitamin field, although the output of papers shows no signs of diminishing. Comparatively little attention has been paid to the older vitamins, with the exception of vitamins A and B_1, where research workers are concerned with the relationship between vitamins A_1 and A_2 on the one hand and with the way in which vitamin B_1 is destroyed by certain plant extracts on the other. Scientific workers in this country have now agreed to use the American name, thiamine, for vitamin B_1 in place of the older name, aneurine. Of the work carried out relating to the newer vitamins, particular note should be taken of a report that vitamin B_6 deficiency has been produced in humans by giving a pyridoxine antagonist, and of the progress made in elucidating the function of pantothenic acid, which is now shown to be present in a coenzyme that effects the transfer not only of acetyl groups but also of acyl groups in general.

BY far the largest number of papers published during the year under review relate to vitamin B_{12} and, although there is nothing new to report on the chemistry of this substance, new information is available on the various forms of vitamin B_{12} and on the nature of the "intrinsic factor" which, when given orally with the vitamin, makes it effective in pernicious anaemia by this route.

Vitamin A_1 and Vitamin A_2

Many of the papers on vitamin A have been concerned in one way or another with the relationship between vitamin A_1 and vitamin A_2. Both are present in newts,[1] while the tadpoles of *Rana esculenta* and *R. temporaria*, like the adult frogs, contain only vitamin A_1 in contrast to the tadpoles of *R. catesbiana*, which contain only vitamin A_2,[2] although in this species also the adult frogs contain only vitamin A_1.

The suggestion that vitamin A_1 occurs in salt water fishes and vitamin A_2 in fresh water fishes is now regarded as an oversimplification. While there may be a specific provitamin A_2 which can be converted into vitamin A_2 by certain fishes, there is no evidence of this and the chances are that the presence of vitamin A_2 is determined by the presence of vitamin A_2 in the diet of the fish concerned. All salt water fish liver oils contain much more vitamin A_1 than A_2, the proportion depending on the species; in cod liver oils, vitamin A_2 may account for about one-seventh of the total.[3]

Oils can be tested for both vitamins by determining the values of $E_{1\,cm.}^{1\%}$ at 693 *mμ* and 620 *mμ* after reacting the unsaponifiable fraction with antimony trichloride, and the values of $E_{1\,cm.}^{1\%}$ at 326 *mμ*, 351 *mμ*, and 286 *mμ* on the unsaponifiable fraction itself. The absorption at 693 *mμ* measures the vitamin A_2 directly and from it the contribution made by the vitamin A_2 to the ultra-violet absorption at 351 *mμ* and 327 *mμ* can be calculated. Vitamin A_2 has a biological potency of $1{\cdot}33 \times 10^6$ i.u. per g., that of vitamin A_1 being $3{\cdot}33 \times 10^6$ i.u. per g.

Estimation of Vitamin A

A critical review of the spectrophotometric estimation of vitamin A has been published.[4] The application of the Morton and Stubbs correction to the optical density of the oil gives results with halibut liver oils and concentrates similar to those obtained when applied to the unsaponifiable fraction, but with cod liver oils higher results were obtained on the oil than on the unsaponifiable fraction.[5] The use of the factor of 1,600 for converting uncorrected values of $E_{1\,cm.}^{1\%}$ into international units gave satisfactory results with halibut liver oils but not with cod liver oils or concentrates. The potency of *neo*-vitamin A was found to be 72 per cent. of that of all-*trans*-vitamin A.

Lard contains a vitamin A-replacing factor, the nature of which is unknown.[6] A method of estimating vitamins A and E by paper chromatography has been described.[7] Several patents and papers relating to the synthesis of vitamin A have appeared[8] and one patent covering the preparation of compounds related to *β*-carotene.[9] A patent covering the preparation of concentrates of fat-soluble vitamins stabilised by the non-liquid constituents of egg yolk has been published.[10]

Vitamin D

There is again little new to report on vitamin D. When a massive dose (40,000 i.u.) of ergocalciferol was given to rats, most of it was deposited in the liver and there was no significant transfer from the liver to other tissues of the body.[11] Only about 23 per cent. of the dose given was accounted for, the fate of the remainder being unknown. The provitamin D of birds appears to be 7-dehydrocholesterol, but there is no evidence that it is present in the preen glands as has previously been suggested;[12] there is a high concentration in the fat. Vitamin D is said to be separated satisfactorily from vitamin A by chromatography on alumina.[13] If necessary, sterols can first be removed by precipitation with digitonin, and the vitamin D can then be estimated by reaction with antimony trichloride.

Vitamin E—a Natural Antioxidant

Interest in vitamin E during the period under review has been mainly concerned with its antioxidant properties. It appears to be a normal constituent of fish liver oils and may serve as a natural antioxidant.[14] Supple-

mentation of a winter ration for cows with tocopherol acetate had no effect on the keeping quality of the butter, nor did it increase the yield of milk or milk-fat.[15]

Because of the possible connexion between muscular dystrophy in farm animals and the presence or absence of vitamin E in the diet, the amounts of tocopherol in various common feedingstuffs have been estimated; grass, clover, and lucerne contained 10 to 40 mg. per 100 g. of dry matter.[16] Vitamin E can be estimated by paper chromatography.[7, 17]

Role of Vitamin C

Suggestions continue to be made as to the role of vitamin C in the animal economy, and in particular the nature of its antiscorbutic effect. It has been shown to be necessary for the formation of collagen,[18] and it appears to function at two points in the tyrosine oxidase system.[19] It also facilitates the conversion of pteroyl glutamic acid into citrovorum factor, and the release of the latter from conjugates.[20]

The antiscorbutic activity of ascorbic acid cannot be accounted for on the basis of its ability to detoxify cyanide, since analogous substances which are without antiscorbutic properties have a similar effect.[21]

A study of the ascorbic acid content of different varieties of potato grown in New Zealand and the effect of storage under different conditions has been reported.[22]

Thiamine—not Aneurine

An event of some importance during the year is the adoption by scientific societies responsible for the publication of papers in Great Britain of the American name thiamine for vitamin B_1 in place of the name aneurine, which has been used until recently, although it should be noted that the British Pharmacopoeia 1953 still uses aneurine hydrochloride as the official description, with thiamine hydrochloride as a permitted synonym.

A method of separating thiamine, riboflavin, nicotinamide, and pyridoxine from one another by means of paper chromatography and then estimating each one separately has been described.[23] Thiamine has also been separated from choline by partition chromatography using starch columns.[24] Thiamine can be very easily estimated in pharmaceutical preparations containing other members of the vitamin B complex by precipitating its reineckate in 33 per cent. methanol, dissolving the precipitate in acetone, and estimating the colour of the solution at 525 *mμ*.[25] In dry media, thiamine is said to be stable for long periods at *p*H 4, but the stability decreases with increasing *p*H; copper has a negligible effect on dry preparations.[26]

Thiamine and Plant Constituents

Further work on bracken thiaminase, which inactivates thiamine, has indicated that the "co-factor" isolated from bracken contains several amino acids, including proline.[27] Proline and hydroxyproline, as well as the related substances pyrrolidine and sarcosine, exhibited activity when tested *in vitro* on the bracken thiaminase system; presumably these bases can replace the thiazole moiety of the thiamine. Thiamine is also attacked by other plant constituents with cleavage of the thiazole ring,[28] extracts from plants of the genus *Allium* converting it into allithiamine to which the structure shown at the foot of this column has been assigned.

Allithiamine is reduced by cysteine with the formation of aneurine and S-allylmercaptocysteine. Allithiamine is utilised by many fungi and can replace thiamine in the diet of the rat.[29] Patents for the preparation of phosphorylated thiamine derivatives have been published.[30]

Riboflavin and Lyxoflavin

Riboflavin deficiency in rats results in a derangement of tryptophan metabolism, anthranilic acid and its metabolites being excreted together with large quantities of xanthurenic acid.[31] On administration of riboflavin, the amounts of xanthurenic acid excreted return to normal values. Riboflavin is probably concerned with the phosphorylative stages rather than with the oxidative stages of the metabolism of tryptophan.

The precise status of lyxoflavin still remains somewhat of a mystery, but evidence is accumulating that it should no longer be regarded as a vitamin. Thus, although to a limited extent it can replace riboflavin in the nutrition of *Lactobacillus casei*, of the rat, and of the chick,[32] it is only effective in presence of riboflavin, apparently increasing the efficiency with which riboflavin is utilised.[33] On the other hand, it stimulates the growth of *L. lactis* even in the absence of riboflavin, and is stored in the cells, whereas it is not deposited in the cells of *L. casei*. Again, it produces good growth in young turkeys,[34] but as there is no evidence that it occurs naturally, lyxoflavin should not be considered to be a vitamin.

Patents for improved methods of making riboflavin by fermentation with *Eremothecium ashbyi* have been published.[35] Over 1,000 *μ*g. of riboflavin per ml. can be produced in four to five days by submerged culture.[36] The mould requires two unidentified nutritional factors. The richest known source of riboflavin has recently been shown to be saffron, the stigmas of *Crocus sativus*, which contains 56 to 138 *μ*g. per g.[37]

Riboflavin Metabolism

A study of riboflavin metabolism in women on controlled diets indicated that urinary excretion was equivalent to 27 to 40 per cent. of the intake and that an intake of 1·2 mg. per day might have been inadequate for two out of the seven subjects used in the test.[38] The daily fasting values for total and free riboflavin in the serum were 3·2 and 1·4 *μ*g. per cent. respectively. Pigs required 1·25 mg. of riboflavin per lb. of feed for gestation and lactation, 0·83 mg. being adequate for gestation but not for lactation.[39]

A polarographic method of estimating riboflavin has been described,[40] and an improved medium for

the microbiological assay of riboflavin has been devised[41] which enables six-point, self-contained assays to be carried out from which confidence limits can be calculated.

Microbiological Synthesis in Animals

At night-time, rabbits excrete soft faeces which they eat, a phenomenon known as coprophagy. These soft faeces represent about 30 per cent. of the total faeces and have now been shown[42] to contain three or four times as much riboflavin and nicotinic acid as hard faeces, six times as much pantothenic acid, and two to three times as much vitamin B_{12}. Coprophagy is therefore an important source of the vitamin B complex in this species.

In ruminants, as is well known, bacteria in the rumen synthesise large amounts of the vitamin B complex which become available to the host animal. It has recently been reported[43] that as much riboflavin and nicotinic acid and half as much pantothenic acid was synthesised in the rumen of a calf fed a purified diet containing urea as the sole source of nitrogen as was found in the rumen on a natural ration; the amounts provided by the bacteria in the rumen were similar to those ingested in the food.

Nicotinic Acid Metabolism

Biochemists are still preoccupied with the complex problem of nicotinic acid metabolism, and paper chromatography is being increasingly used to identify the metabolites. In man these were, nicotinuric acid, N^1-methyl-nicotinamide, and nicotinamide.[44] Rats excreted nicotinic acid in addition. N^1-methyl-2-pyridone-5-carboxylamide which is also probably excreted by both species cannot be detected by chromatography. Rabbits excrete all these substances except nicotinamide.[45] After injection of C^{14}-carboxyl-labelled nicotinic acid and nicotinamide into rats, seven and nine radioactive metabolites respectively were separated by paper chromatography from the urine.[46] The chief metabolite of nicotinic acid was nicotinuric acid and of nicotinamide N^1-methyl nicotinamide.

It has again been confirmed[47] that nicotinic acid deficiency is produced when the level of essential amino acids in a diet containing minimal amounts of tryptophan is increased.

Vitamin B_6 Deficiency in Humans

In previous reviews, reference has been made to the role of pyridoxine as a biochemical catalyst, especially in amino acid metabolism. In rats, however, a vitamin B_6 deficiency did not interfere with the transamination of lysine and apparently promoted the formation of urea from this and other amino acids[48]; nor was any significant alteration observed in the amount of regenerating tissues or their constituents.[49]

Vitamin B_6 deficiency can be induced in humans by feeding desoxypyridoxine. The symptoms included anorexia, nausea, listlessness and lethargy, a seborrhea sicca-like dermatitis, and polyneuritis.[50] Thus pyridoxine has been shown to be an essential nutrient for human beings; 2 to 3 mg. per day are required for normal health.

Another symptom of vitamin B_6 deficiency can be observed in pregnant women who may excrete abnormally large amounts of xanthurenic acid following the administration of tryptophan; the metabolic defect can be prevented by giving pyridoxine.[51] Pregnant women should be given 10 mg. per day.

Another enzyme system has now been shown to depend on the presence of vitamin B_6. This is hepatic thionase (cysteine desulphhydrase), the activity of which is greatly depressed in vitamin B_6 deficiency and restored when the diet is supplemented by pyridoxine.[52]

Pyridoxine, pyridoxal, and pyridoxamine can be separated from one another by paper chromatography and the zones extracted and individually assayed with *Saccharomyces carlsbergensis*.[53]

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(*Continued on page* 99)

Sugar Technology

ONE of the few volumes which fall into Bacon's category of those "to be read wholly and with diligence and attention," is a symposium,* edited by Dr. Honig, Director of Research of the West Indies Sugar Corporation, who has taken as his objective the covering of the whole sugar industry, developing the theme of the interrelation of its applied technology and underlying fundamental science. This is no catalogue of plant and processes with *ad hoc* descriptions and recipes, but a serious and successful attempt to bring together between two covers the whole of the scientific data immediately affecting sugar manufacture.

Properties of Sucrose

There are 18 divisions: the first two, dealing with the chemical and physical properties of sucrose, are by Dr. H. Hirschmüller, Director of the *Institut für Zuckerindustrie*, in Berlin. To condense the chemistry of sucrose into 14 pages is a considerable task which Dr. Hirschmüller has done well, but at the sacrifice of much detail which might, perhaps, have been advantageously included.

The second section on the physical properties of sucrose is more detailed and includes extensive tables of densities, refractive indexes, solubilities, and viscosities which are valuable for reference. These two sections could have been improved as to presentation by a final revision by an English reader, which would have eliminated the frequent mis-spellings and Germanic forms and, not least, the continual confusion of tenses (*e.g.* "fructosane" for "fructosan," "dilivered," "brutto formula," "at the combustion," "soluted substances," "the m.p. amounts to 186°," and the lovely heading on p. 26 "caloric dates"—which even if related to "sugar daddy" ought not to figure in a sober work of science!).

* *Principles of Sugar Technology*. Edited by P. Honig. Pp. 767+xxii. Elsevier. Price 95s.

Dextrose and Levulose

No such criticism can be levelled at the third contribution, that of Dr. E. J. McDonald of the National Bureau of Standards, Washington, dealing with the physical and chemical properties of dextrose and levulose. Here is a valuable repository of physical data, some hitherto unpublished, which will be of great value to workers in the sugar field. This section is not without a few errors —"benzoated" for "benzoylated," "propyledene" for "propylidene," "aromatic amines of glucose," and no reference to Table 14 appears in the text, while several of the groups have become displaced in the diagram at the bottom of p. 95. The section contains a survey (20 pages) of the analytical methods available for the determination of reducing sugars.

Sugar Cane Research

Dr. L. F. Martin, of the Southern Regional Research Laboratory, New Orleans, has contributed two sections (Nos. 4 and 6) on the non-nitrogenous organic acids of sugar cane and complex organic non-sugars of high molecular weight. The former section deals with acids such as malic, oxalic, fumaric, and aconitic in so far as they affect sugar refining, and a section is included on the recovery of aconitic acid, the most abundant non-sugar constituent of cane juice, by basic exchange resins. There is, in addition, an important section on the action of these acids on clarification, on molasses quality and on scaling (with particular reference to calcium oxalate and the aconitic acid Ca/Mg salt $Ca_2Mg(C_6H_3O_6)_2 \cdot 6H_2O$). The second section deals with the cellulose, pectin, starch, and lignin groups.

A section of 20 pages is contributed by Dr. L. F. Wiggins, Director of the British West Indies Sugar Research Scheme of Trinidad, on the nitrogen containing non-sugars of sugar cane, comprising the amino acids and proteins, which admirably summarises the present state of this subject. The lipid portion of sugar cane is dealt with by Dr. R. T. Balch, of the U.S. Dept. of Agriculture; the nature, extraction on an industrial scale, and analytical control of the cane wax are all discussed.

This division of the work (substances occurring in sugar cane) is completed by two sections, one by the editor, Dr. Honig, on the inorganic constituents, together with their determination in the various raw, intermediate, and final stages of sugar production, and a substantial section by Dr. T. R. Gillett, of the Californian and Hawaiian Sugar Refining Corporation, on colour and coloured impurities in sugar. These are divided into two main groups, those such as anthocyanin, carotene, xanthophyll, and chlorophyll which pre-exist in the cane, and those which are formed in production from compounds such as the amines and polyphenols, or which may be formed from sucrose itself by caramelisation. These substances are clearly of vital interest to the sugar refiner, and this accounts for the extensive length of this section (100 pages), which contains much scientific data on the removal of colour and of its measurement.

Manufacture and Technology

The subsequent sections deal with the technology of sugar manufacture and refining; in Section 10, Dr. K. D. Dekker, Director of the Sugar Milling Research Institute, S. Africa, surveys the reagents used in manufacture and refining. This is a subject of peculiar importance in the industry as the carbon dioxide liberated in forming lime from calcium carbonate is used to precipitate the calcium of calcium saccharate, so that a nice balance between the two is essential; sulphur dioxide, phosphates, soda ash, bauxite, clays, and carbons (chars) are all included, and there is a useful appendix on dyes for sugar blueing.

Dr. G. W. Payne, of Tate and Lyle, England, contributes a sec-

tion on what might be termed the physics and physical chemistry of sugar refining. This excellently written section is a fine realisation of the editor's objective, namely, to collect and display the fundamental scientific principles underlying the technology of sugar manufacture. The editor adds to this a short section on the chemical technology of the purification process, giving an account of progress in the last decade and its effects on modern practice. The remaining sections are:

13. Fundamental Reactions of the Clarification Process. J. H. Payne, Hawaiian Sugar Planters Association.
14. Technology of Clarification. J. G. Davies, New Yarmouth, Ltd., British W. Indies.
15. Clarification by Sulphitation. J. Marchés, former Technologist, Java Sugar Experimental Station.
16. Carbonation. P. Honig.
17. Middle Juice Carbonation. T. Y. Chou, Taiwan Sugar Corporation, China.
18. Ion Exchange. J. H. Payne (as above).

All deal exhaustively with the technique indicated and are very sound accounts of modern practice.

The real test of a volume of this kind is how much it enables those responsible for the industry to improve their practice. The proof of this can only come with time, but all the internal evidence goes to show that it will be of immense help to those who study it.

Incidentally, the title is something of a misnomer; it should read "Principles of Cane Sugar Technology" as beets are scarcely mentioned.

The volume is excellently produced and bound, and the printing is of a high character. Two small innovations in the printing are likely to be confusing, namely, printing "180-185°" as "180 . . 185°" and the interchange of full point and decimal point so that 3.1·10 means $3 \cdot 1 \times 10$ and not $3 \times 1 \cdot 10$ as would normally be expected. This could cause considerable trouble for which there seems to be no compensating advantage.—G. M. D.

Correspondence

To the Editor,

FOOD MANUFACTURE

Chemicals in Food

DEAR SIR,—I read with considerable interest your editorial on the Home Service Broadcast about food in the series "Can't we do better than this?" It was an extremely difficult subject from every point of view and even if you feel it could have been handled better, I feel you should have more than balanced your criticism with praise for the B.B.C. in arranging a discussion of so controversial a subject, in providing freedom of speech where both the Government and the food monopolies wish to smother it.

The broadcast made the public aware that chemicals are added to foods and that it is arguable that these chemicals are injurious. That is all the broadcast should have done. An intelligent listener cannot have the subject settled for him: being aware of it he should obtain, as he easily can, further information and then decide for himself what, if anything, he should do.

I suggest that if, after thinking for himself, anyone believes that chemically treated food is bad food, then he should demand that an exact description of all the ingredients and chemicals in foods should be printed on the wrappers or containers. Then he can see what is in jams, biscuits, bottled fruits, Cellophane-wrapped dyed kippers, etc. This is compulsory in countries as different as the U.S.A. and Egypt. People who like chemicals can then be sure they are getting them; people who dislike chemicals can avoid them: in fact freedom for all. And if the firms who sell chemically treated food say it is not freedom to be forced to tell the public what it buys, I can only wonder whether they are not confusing freedom with their natural desire to hide what they know is shameful.

Yours faithfully,
FRANKLIN BICKNELL.

London.

Milk Pasteurisation Plant

As a result of a suggestion put forward by certain members of the Society of Dairy Technology that an inexpensive and simply written small book dealing with the operation and maintenance of pasteurising plant would be extremely valuable, a committee was formed to consider the matter. When the scope of the book was decided, various members of the Society who had had considerable experience of the various aspects of the subject were invited to contribute chapters or sections.

The book* has now been published and covers modern pasteurising plant and ancillary equipment including instruments; the operation of pasteurising plants; its cleaning and sterilisation; its inspection and maintenance; laboratory control; and some aspects of the regulations relating to pasteurisation.

Although written mainly from the point of view of the H.T.S.T. plant, the book deals fully with the methods for batch and holder (retarding) plants. It is well illustrated and selected references are given for further reading.

This is the type of book which can be put in the hands of the dairy employee who is at the start of his career in the dairy industry; at the same time it is packed with information that the manager and foreman will find useful for "refresher" purposes.

* *Pasteurising Plant Manual*. Pp. 107. Society of Dairy Technology. Price 5s.

The Vitamins

(*Continued from page* 97)

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46 B. C. Johnson and P.-H. Lin, *J. Amer. Chem. Soc.*, 1953, **75**, 2971, 2974.
47 L. M. Henderson *et al.*, *J. Biol. Chem.*, 1953, **201**, 697.
48 J. R. Beaton *et al.*, *J. Biol. Chem.*, 1953, **201**, 587.
49 J. R. Beaton *et al.*, *J. Biol. Chem.*, 1953, **204**, 715.
50 R. W. Vilter *et al.*, *J. Lab. Clin. Med.*, 1953, **42**, 335.
51 M. Wachstein *et al.*, *J. Lab. Clin. Med.*, 1953, **42**, 98.
52 R. Q. Thompson and N. R. Guerrant, *J. Nutr.*, 1953, **50**, 161.
53 J. Q. Snyder and S. H. Wender, *Arch. Biochem.*, 1953, **46**, 465.

(*To be continued*)

Beet Sugar Refining in the U.S.A.

Part 1

Almost a quarter of the sugar consumed in the United States is made from sugar beet, grown by about 60,000 farmers and processed by 19 companies operating 80 refineries with a total daily slicing capacity of 148,350 tons of beets. The beet sugar industry has steadily reduced the number of man-hours required to process a ton of sugar beet. Although the efficient utilisation of capacity and the labour force is largely dependent upon the size and quality of the beet crop, technological improvements effecting more continuous and automatic operations have resulted in reductions in labour expended per ton of beets sliced from more than two man-hours in 1920 to less than one in 1951.

FOR many years, the two refining processes of diffusion and slicing had been relatively inefficient, and created waste due to prolonged storage. In recent years, however, much man-hour saving has resulted not only from improvements in these two processes, but also from an increased mechanisation in handling beets, white sugar, and pulp, and the addition of automatic control devices. Man-hour requirements for the six plants surveyed in this report* reflect differences in equipment used and in the volume of operations, degree of beet purity, and labour conditions.

Beet Sugar Refining Process

The extraction of pure sugar from sugar beets may be summarised by the following steps: beet cleaning and slicing, diffusion, juice purification, evaporation, crystallisation, and packing. Many refineries perform additional operations, such as recovery of additional sugar from molasses, recovery of by-products, and pulp preparation.

Plant Characteristics

The six plants selected for this report are representative of the beet sugar industry in the United States in terms of size, age of equipment, location, and type of production methods.

All plants are members of large multiplant companies which provide purchasing, sales and administrative functions, and research and analytical control methods. Plant A has a slicing capacity under 2,000 tons per 24 hours, Plants B, C, D, and E have capacities of about 3,000 tons, and Plant F has a slicing capacity of more than 3,000 tons. One plant is equipped to use the ion exchange process, although it was not in use at the time of the survey. Two plants extract additional sugar from molasses by the Steffens process.

* Abstract of Case Study Data on Productivity and Factory Performance, prepared for the Mutual Security Agency, Productivity and Technical Assistance Division, by the United States Department of Labour.

TABLE 1

MAN-HOUR REQUIREMENTS PER TON OF BEETS SLICED AND PER HUNDRED POUNDS OF SUGAR PRODUCED, BY TYPE OF LABOUR, IN SIX SELECTED BEET SUGAR REFINERIES, U.S.A., 1951

Type of labour	*Plant* A	B	C	D	E	F
	Man-hours per ton of beets sliced					
Total factory labour	0·887	0·730	0·727	0·886	0·624	1·293
Direct labour	·538	·463	·442	·588	·400	·913
Indirect labour	·349	·267	·285	·298	·224	·380
	Man-hours per hundred pounds of sugar produced					
Total factory labour	0·329	0·283	0·259	0·348	0·232	0·486
Direct labour	·200	·179	·158	·231	·149	·343
Indirect labour	·129	·104	·101	·117	·083	·143

Man-hour Requirements

The labour requirements of the six plants range from 0·624 man-hours per ton of beets sliced for Plant E to 1·293 man-hours for Plant F (Table 1). The efficiency of Plant E is the result of its up-to-date continuous and automatic equipment and controls. By comparison, the larger number of man-hours of Plant F include certain operations not performed by

TABLE 2

DIRECT MAN-HOUR REQUIREMENTS PER TON OF BEETS SLICED BY OPERATION OR LABOUR ACCOUNT IN SIX SELECTED BEET SUGAR REFINERIES, U.S.A., 1951

Operation or labour account	*Plant* A	B	C	D	E	F
Beet end:						
Receiving	0·020	0·026	0·061	0·029	0·021	0·077
Handling (flumes, trash catchers, beet washers)	·121	·040	·062	·067	·040	·068
Slicing (weighers, knife filers, setters, picking table)	·045	·040	*	·044	·040	*
Diffusion (battery foremen, cell fillers, dumpers, pulp handlers)	·061	·008	·022	·055	·008	·114
Carbonators (sulphur burners, tankmen)	·015	·008	·008	·022	·002	·011
Filter pressmen, laundry men	·045	·072	·051	·077	·059	·112
Evaporators		·008	·008	·011	·088	·011
Utility men	·015	·021	·012	†	·008	·030
Lime kiln	·030	·018	·044	·055	·024	·059
Reclaiming	†	†	†	†	†	·019
Sugar end:						
Boilers, crystallisers, helpers	·030	·032	·032	·022	·027	·043
Granulators	·015		·000	·011	·008	·015
Centrifuges, melters	·045	·058	·066	·066	·048	·163
Utility men	†	·013	·006	·004	*	·015
Packing	·096	·119	·024	·125	·101	·081
Steffens operations	†	†	·037	†	†	·095
Total direct labour	·538	·463	·442	·588	·400	·913

* Included in handling.
† Operation not performed.

TABLE 3

DIRECT MAN-HOUR REQUIREMENTS PER HUNDRED POUNDS OF SUGAR PRODUCED BY OPERATION OR LABOUR ACCOUNT IN SIX SELECTED BEET SUGAR REFINERIES, U.S.A., 1951

Operation or labour account	*Plant*					
	A	*B*	*C*	*D*	*E*	*F*
Beet end:						
Receiving	0·0075	0·0103	0·0216	0·0116	0·0079	0·0288
Handling (flumes, trash catchers, beet washers)	·0448	·0153	·0222	·0260	·0149	·0256
Slicing (weighers, knife filers, setters, picking table)	·0168	·0154	*	·0173	·0149	*
Diffusion (battery foreman, cell fillers, dumpers, pulp handlers)	·0224	·0031	·0080	·0217	·0030	·0428
Carbonators (sulphur burners, tankmen)	·0056	·0031		·0087	·0030	
Filter pressmen, laundry men	·0168	·0277	·0239	·0304	·0219	·0504
Evaporators		·0031		·0043	·0030	
Utility men	·0056	·0082	·0044	†	·0030	0·112
Lime kiln:						
Reclaiming	·0112	·0072	·0155	·0217	·0089	·0220
Sugar end:						
Boilers, crystallisers, helpers	·0112	·0123	·0114	·0087	·0099	·0161
Granulators	·0056		·0033	·0043	·0030	·0057
Centrifuges, melters	·0168	·0226	·0234	·0260	·0179	·0612
Utility men	†	·0051	·0022	·0014	†	·0056
Packing	·0355	·0462	·0084	·0491	·0378	·0305
Steffens operation	†	†	·0130	†	†	·0360
Total direct labour	·1998	·1796	·1575	·2312	·1491	·3432

* Included in handling.
† Operation not performed.

Plant E and other plants. The man-hours, however, also reflect difficulties in beet receiving, high maintenance hours, and more man-hours at some operations as a result of older equipment.

The remaining plants have similar total labour requirements, yet indicate some differences among individual operations, most of which are the result of the equipment employed.

The number of man-hours required to process a ton of sugar beets and to produce a ton of sugar are shown by type of labour and by operations in Tables 2, 3, 4, and 5.

With certain exceptions (such as ion exchange, an operation not used in 1951 by any of the surveyed plants), the operations in beet sugar refining are identical in all plants. Differences in the man-hour requirements per ton may be attributable in most cases to the type of equipment used, the number of employees at each operation and in maintenance functions, and to operations such as the Steffens process which is not performed in all plants.

The labour requirements do not include man-hours of persons engaged in office work, purchasing, selling, and other general administrative duties, or of persons in the parent company offices or testing and research laboratories. The number of employees at each operation is generally largest on the first shift and is considerably reduced for the two following shifts, particularly in maintenance functions.

Operations in a Typical Plant

New continuous type equipment, automatic instrument controls, and co-ordination in steam and vapour use have reduced the total labour requirements of a modern American beet sugar refinery to less than 15 man-minutes per 100 pound bag of white sugar. This may be illustrated by a summary of the operations of Plant E, which operates at a daily slicing rate one-third greater than designed capacity, and has the least number of man-hours required per ton of the plants surveyed in this report. Because of the location of the refinery in an area where high temperatures do not allow long storage of the beets, both speed and co-ordination of beet slicing to receipt of beets and oversize equipment at critical points were necessary.

A maximum of 4,500 tons of beets a day are delivered by railroad cars and trucks, weighed, tested, and pumped by two 5,000 gallon-per-minute pumps through flumes to the next process. About 60 per cent. of the flume water is recirculated. After washing and trash removal, the beets pass over a magnetic pulley for the removal of tramp iron, and are fed to four Ogden slicers. The battery operator co-ordinates the speed of the slicers to the requirements of the diffuser. These slicers are each driven by a 50 h.p. gear-reduction motor and can be varied in speed from 60 to 120 r.p.m. A Merrick Weightometer automatic recording scale weighs the cossettes entering the diffuser and simultaneously regulates the amount and flow of water and its temperature (140°F.) to the diffuser.

The diffuser is a Silver 21-cell continuous type, one of 16 in use in the industry. The unit is installed in two banks, nine cells over 12 cells, through which perforated steel shelves move, driven by 10 3 h.p. direct current motors. The unit is operated by one man only, a saving of about 168 man-hours per 24 hours over conventional batch-type units. The diffuser extracts about 98 per cent.

TABLE 4

INDIRECT MAN-HOUR REQUIREMENTS BY OPERATION OR LABOUR ACCOUNT IN SIX SELECTED BEET SUGAR REFINERIES, U.S.A., 1951

Operation or labour account	*Plant*					
	A	*B*	*C*	*D*	*E*	*F*
	Per ton of beets					
Total indirect labour	0·349	0·267	0·285	0·298	0·224	0·380
Plant supervision	·076	·034	·039	·048	·040	·035
Boilerhouse	·040	·032	·010	·055	·016	·015
Laboratory	·066	·053	·074	·055	·045	·052
Maintenance	·081	·069	·078	·074	·048	·185
General*	·086	·079	·084	·066	·075	·093
	Per hundred pounds of sugar produced					
Total indirect labour	0·1288	0·1036	0·1013	0·1171	0·0835	0·1429
Plant supervision	·0280	·0133	·0140	·0188	·0149	·0133
Boilerhouse	·0149	·0123	†	·0217	·0060	†
Laboratory	·0243	·0205	·0263	·0217	·0169	·0197
Maintenance	·0299	·0267	·0312	·0289	·0179	·0750
General*	·0317	·0308	·0298	·0260	·0278	·0349

* General includes watermen, watchmen, sweepers, janitors, and supply handlers.
† Information not available.

The Merrick Weightometer automatic scale.

of the sugar present in the beets in a cycle time of about 80 minutes, at a uniform automatically controlled temperature (70°C.).

Although most refineries use either the Silver continuous diffusion system as described for this plant or the Roberts batch-type system, another type used is the Oliver-Morton continuous diffusion process. This system consists of a line of 24 to 28 tanks set at a slight incline through which water flows by gravity, the cossettes being moved in the opposite direction by means of a scroll and lifter paddles.

In using this method the loss of sugar was reported to have been reduced from 3·10 to 1·86 pounds per hundredweight. In addition, about 15 pounds fewer of juice, with a higher sugar content, is drawn off, with resulting savings in fuel required for evaporation.

Other advantages are low initial cost, simplicity of operation, and flexibility. The speed of drive and the number, size, and arrangement of cells may be changed to meet different requirements, and removable covers make all parts of the mechanism easily accessible for inspection or adjustment.

Diffusion juice (about 14 Brix) is pumped to heaters where its outflowing temperature is automatically controlled at 85° to 90°C. Tubes from these heaters are arranged so that they may be withdrawn singly to remove scale. Closed heaters are replacing open injection heaters because a closed heater prevents the condensate from diluting the sugar liquor and will operate on a lower pressure vapour. The heated juice then enters the continuous carbonation systems through a 14 foot diameter Benning carbonator where the *p*H is automatically controlled. A Benning carbonator replaces the first and second tanks in the conventional Dorr carbonation system, with savings in equipment cost and space occupied. However, there is a disadvantage in a single unit requiring the refinery beet end to be shut down if the carbonator becomes so scaled as to require cleaning.

The glass-calomel electrode units develop a small voltage, determined by the *p*H and temperature of the solution, which is automatically and continuously recorded by a controlling potentiometer. The control unit regulates the addition of kiln gas or liming reagent. The gassed, limed juice, under a pressure of seven pounds per square inch, is clarified in a 28 foot Dorr thickener and heated by a third vapour to an automatically controlled temperature of 85°C.

After the second carbonation in which the *p*H controller regulates the amount of gas introduced, the juice is filtered and pumped to the sulphur tower. The amount of sulphur dioxide gas introduced is automatically controlled by a *p*H instrument. The thin juice

TABLE 5

PRODUCTION AND RELATED STATISTICS, SIX SELECTED BEET SUGAR REFINERIES, U.S.A., 1951

Plant operating data	*Plant*					
	A	*B*	*C*	*D*	*E*	*F*
Length of campaign days ..	61	107	107	112	76	107
Tons of beets sliced ..	96,164	323,298	240,929	243,095	228,781	510,682
Sugar in beets, per cent. ..	16·41	15·92	14·58	15·65	16·51	14·56
Sugar losses, per cent. ..	2·89	3·03	0·56	2·92	3·10	0·93
Battery	·23	·20	·26	·39	·24	·31
Lime cake	·02	·04	·05	·04	·02	·03
Molasses	2·60	2·37	·00	2·20	2·86	·00
Steffen filtrate	·00	·00	·16	·00	·00	·08
Unaccounted	·04	·42	·09	·29	·03	·51
Tons of sugar produced ..	13,005	41,720	33,803	30,994	30,697	67,957
Powdered	199	550	none	134	52	1,420
Tablet	none	none	none	none	none	none
Liquid	none	none	5,500	none	none	19,594
Tons of pulp produced:						
Wet	26,445	none	82,000	none	none	none
Dried	none	19,443	none	12,513	15,990	33,746
Tons of molasses:						
Not processed	4,370	14,275	none	9,985	12,517	none
After processing	none	none	1,841	none	none	7,910
Tons of sugar packed:						
100 pound bag	11,959	27,379	12,420	15,986	9,119	38,931
25 pound bag	156	783	500	804	none	504
10 pound bag	1,196	8,604	1,599	6,582	609	4,880
5 pound bag	691	4,404	1,043	3,928	952	2,328
Other	none	none	18,231	none	19,970	21,434

from sulphitation is pumped to a boiler where temperature (98°C.) and juice level are automatically controlled, and to heaters (148°C.).

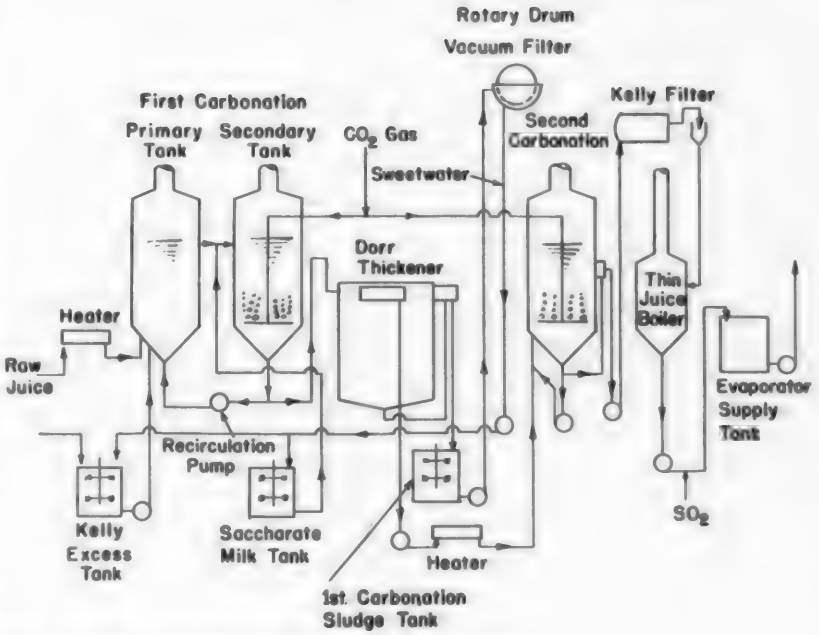
Continuous carbonation systems are now widely used and offer large savings in labour and maintenance over the older batch-type methods. In 1920, no known continuous systems were in use in the United States; in 1947, more than 66 per cent. of the refineries had continuous first carbonation and more than 94 per cent. had continuous second carbonation.

Because of transportation costs, if the refinery is located at a distance from the supplier, sulphuring by the addition of liquid sulphur dioxide is seldom used, although the method eliminates many of the difficulties arising from the use of the sulphur stove.

The Swenson, five-effect long-tube evaporators using automatic pressure controls are so designed that the vapours provide heat for numerous other operations. The flow of juice (13·4 Brix) to the first effect is automatically controlled, and constant juice levels are automatically maintained in all effects.

The thick juice effluent from the fifth effect is blended with centrifugal wash-syrup and high-raw melted sugar and is filtered in seven plate-and-frame filters, using a refined diatomaceous filter aid. The high quality liquor goes to a storage tank (1,620 cubic feet capacity), also with automatic temperature control, whence it is drawn by vacuum to the two white pans.

The calandria-type Stearns-Rogers vacuum pans have automatic pressure controls, and vapours are drawn off with automatically operated water-jet condensers. Calandria-type pans can operate on much lower steam pressure than coil pans. There is no successful type of automatic vacuum pan controller for beet massecuites which can cover all variables, although it is used in cane sugar refining. The massecuite from a strike flows to a mixer (1,300 cubic feet capacity) and then to six centrifugals.

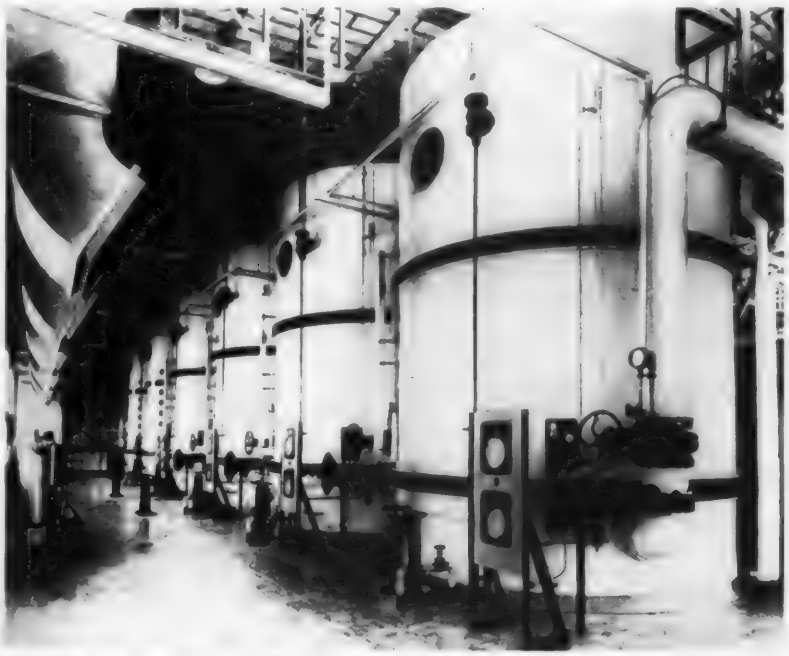


Dorr system of continuous first and second carbonation.

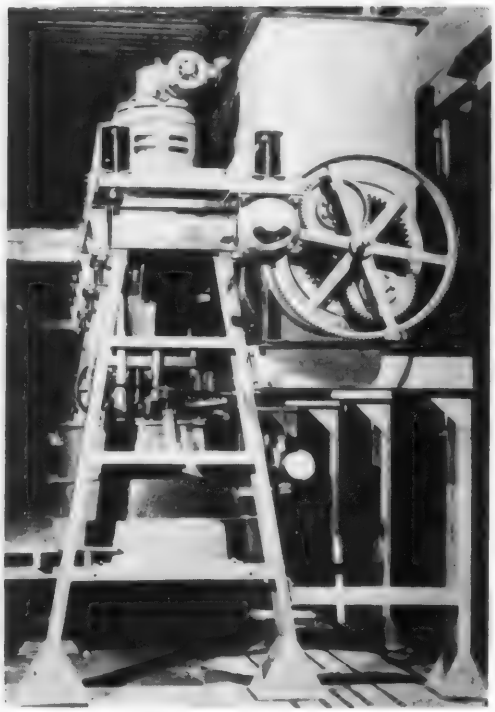
The centrifugals are 40 inches in diameter, 30 inches deep, and run at 1,600 r.p.m., with individual motors and fluid clutch, completely automatic except for filling and discharging. In the companies surveyed in this report, two to three centrifugals are operated by one man who, in some cases, merely pushes a button to load and start the cycle. The sugar is then conveyed (510 pounds per minute) by scroll and elevator to the wet sugar bin (30,000 pounds capacity) and then to a Rotolouvre granulator.

Air, purified by ionisation through a 13,000 volt, direct current grid Precipitron, enters the drier at an automatically controlled temperature. In this type of drier, the air is forced through the sugar instead of the sugar being moved through the air, with a claimed increase in lustre preservation.

The sugar is then elevated at a rate of 505 pounds a minute, screened, automatically weighed by 100 pound lots, and dumped into one of four cylindrical bulk



Calandria-type vacuum pans with automatic controls.



Side view of centrifugal station.

bins each 50 feet in diameter, 106 feet high, and holding 10 million pounds. Air, dried by a calcium chloride dehumidifier, is circulated in the bins to maintain a low relative humidity.

White sugar is loaded in bulk on railroad cars or trucks, or packaged in five, 10, 25, or 100 pound paper or cloth bags. The St. Regis valve-type, 100 pound paper-bag packer eliminates the need for sewing or gluing. After the bag is filled it is removed from the spout, and the paper valve is folded in, preventing leakage. One hundred pound bags may be packed with this apparatus at a rate of more than 500 bags an hour. Bags are conveyed by inclined belt elevators to the stacking level in the air-conditioned warehouse.

Plant E was the first American refinery to use only one steam generator, rated at 150,000 pounds of steam an hour at continuous operation. The unit burns about four million cubic feet of natural gas each 24 hours, and generates steam at 410 pounds per square inch at 575°F. High pressure steam is used for a 3,000 kilowatt turbogenerator, an Elliott blower, and the boiler feed pumps. The turbogenerator develops power at 2,300 volts for the 300 motors used in the plant, and is fractional to 250 h.p. The Elliott blower draws and feeds the carbon dioxide gas at the rate of 5,500 cubic feet a minute.

The beet slicers, requiring 2,500 pounds of steam an hour at 100 pounds per square inch at the knife-cleaning nozzles, and the La Feuille crystallisers are the only units which do not derive steam from first evaporator effect. By means of automatic pressure controllers which add exhaust steam to prevent pressure drops, pressure is stabilised in the first three effects, thereby guaranteeing a constant supply of steam to equipment drawing on these units for heat.

The fuel economy of a refinery is also influenced by the quality of the beets; an increase from 17 to 18 per cent. sugar in beets will reduce fuel requirements more than six million calories per bag of sugar produced.

In addition, the plant is air-cooled at the rate of 330,000 cubic feet of air a minute and ventilated for the workers' comfort.

(To be continued)

Dishes from Many Lands

LIKE the brook, the writing of cookery books bids fair to go on for ever. I have recently read a batch of four out of 10 from publishers' recent lists.

The first one[1] is by a Russian lady who acquired her knowledge of cookery by trial and error. She had eaten in many countries, but the food had been cooked for her. Being obliged to cook for herself on arriving in England, she undertook the remarkable task of making her favourite dishes from memory (although she admits the help of other books) and gradually evolved the finished recipes, mainly Russian, Polish, and Greek.

Maybe its readers may find it useful in becoming acclimatised to the dishes that they will have to eat during their holidays abroad.

In these days, cookery is probably no joke to the housewife, but Mrs. Fearon has written a book[2] that makes it look like one. A humorous cookery book, with comic sketches, is quite a new thing.

The general trend of the book will be indicated by a quotation from chapter 1: "If I can show you how to cook like an angel and only have one saucepan to wash up, that would be different, wouldn't it? And because you could be proud of and interested in the result, you'd want to go right ahead and try some more. Very well, let's go." Then comes the awful climax—"But you must have a labour-saving kitchen."

However, if anyone likes to get the impression of the subject of cooking being discussed just as it might be if a witty Irishwoman had dropped in for afternoon tea, this is the book to read.

The third book[3] is claimed to have two purposes. It is said to bring the best and most typical Italian dishes to our tables, and it helps the traveller in Italy to know what's what when faced with that bewildering menu scrawled in violet ink over what seems to be several square feet of paper.

Mrs. Howe also claims that it is easier to become an expert in Italian cooking than in any other kind, and hopefully suggests that it is almost impossible not to become an enthusiast.

My final book[4] is devoted entirely to apple dishes. Again, the author tries to depart from the conventional recipe book and gives some for every month of the year. A number of the recipes date back to the 18th century, written by "A Lady" or "An Experienced Housewife," in the style of the time. The annotations for each month are prefaced by appropriate verses.—M. J.

[1] *Good Food from Abroad*. By Salome Andronikov. Pp. 101. Harvill Press. **Price 10s. 6d.**

[2] *The Reluctant Cook*. By Ethelind Fearon. Pp. 127. Jenkins. Price 6s.

[3] *Italian Cooking*. By Robin Howe. Pp. 204. Deutsch. Price 10s. 6d.

[4] *The Apple Book*. By Gertrude Mann. Pp. 92. Deutsch. Price 6s.

The Milling Industry

Progress in 1953

A. J. Amos, Ph.D., B.Sc., F.R.I.C.

Part 2

In Part I of this review of the milling industry in 1953, the author considered the characteristics of the different wheats imported during the year and the additions to National and self-raising flour. The second and final instalment is concerned with the quality of post-control flours and their treatment.

SINCE bread forms such an important part of our national dietary—it provides about 35 per cent. of our Calories and over 30 per cent. of our protein requirements—it is right that we should no longer be content to pay heed only to the baking quality and the colour of flour; we should—and now do—regard it not only as a carrier for other foods, such as butter, jam, and fish paste, but as a valuable foodstuff in its own right.

The levels adopted for the token nutrients are well below those which are in force in America. In U.S.A., the flour fortification scheme brings the vitamin content of flour above that of whole wheat; in other words, the Americans have used flour as the vehicle for vitamin supplementation of the diet. The basis of the British scheme is to bring "white" flour back to the level of nutrition which would have obtained had the flour been milled to 80 per cent. extraction, or rather to do so with respect to some of the nutrients; thus the scheme warrants the description "restoration" rather than "fortification."

The Master Mix System

Although the supplementation of white flours with specified nutrients seems a simple project, several problems had to be solved before the scheme could be put into operation. In the first place, agreement had to be reached upon what should be accepted as the nutritional levels of the white flours which required supplementation.

The problem was complicated by the fact that various types of white flour would be made; some mills would produce patent flour, while others would make straight run flour of, say, 70 to 72 per cent. extraction. It was finally decided that two sets of mean values should be adopted, one relating to patent flours and one to straight run.

Having arrived at agreed values for the mean natural nutrient contents of white flours, it was a simple matter to calculate the composition of master mixes which would make good the deficiencies. A point which had to be settled was whether two master mixes should be recommended, one for use with patent flours and the other with straight run, or whether one master mix should be used but in different proportions depending on whether patent flour or straight run flour was being restored. There was no doubt that the latter scheme would be the simpler to operate and less liable to lead to errors, and it was therefore adopted.

The composition of the master mix was so arranged that the deficiencies could be made good by adding 1 oz. of the master mix to each sack of straight run white flour and $1\frac{3}{16}$ oz. to each sack of patent flour. The carrier recommended for the nutrients of the master mix was patent flour dried to a moisture content of 10 per cent., and the composition of the master mix was: vitamin B_1 0·74 per cent.; nicotinic acid 3·365 per cent.; reduced iron 3·14 per cent.; flour 92·75 per cent. Table IV shows the amounts of the nutrients contributed to flour when this master mix is used in the proportions recommended.

Simulated National Flour

The white flour scheme introduced another complication. If a miller made white flour by taking off a patent grade, what was he to do with the residual flour? This would not be a "white" flour, nor would it warrant the description National flour since it would not be of 80 per cent. extraction. The problem was solved by the decision that such a residual flour, although not of 80 per cent. extraction, could be sold as a National flour provided it was of substantially the same nature and contained substantially the same quantities and proportions of constituents as flour of 80 per cent. extraction.

In other words, two types of National flour would be permitted —those which were straight run flours of 80 per cent. extraction and those which were a lower divide taken from a milling of less than 80 per cent. extraction—but they would be similar in colour, baking quality, and nutritive composition.

Since millers could not be ex-

TABLE IV

EXTENT TO WHICH WHITE FLOURS ARE "RESTORED" BY MASTER MIX ADDITIONS

	Amounts contributed by master mix addition mg/100 g.
Patent flours (master mix to be added at rate of $1\frac{1}{16}$ oz./sack)	
Vitamin B_1	0·18
Nicotinic acid	0·825
Iron	0·77
70-72 per cent. straight run flour (master mix to be added at rate of 1 oz./sack)	
Vitamin B_1	0·165
Nicotinic acid	0·75
Iron	0·70

pected to undertake vitamin assays whenever they wished to make a "simulated" National flour, it became necessary to offer the industry guidance upon the balance which should be struck between length of extraction and proportion of patent flour removed if the residual flour were to qualify as National flour.

The information required to supply this guidance could be obtained only by experimentation involving the production of various residual flours, and the subjection of these to chemical and nutrient analyses and baking tests. Moreover, since such flours had to contain "substantially the same quantities and proportions of constituents" as 80 per cent. flour, they had to be assayed not only for the token nutrients but also for the other vitamins present in wheat, such as riboflavin, pantothenic acid, pyridoxin, and biotin. How closely residual flours can resemble 80 per cent. flour in nutritive composition if the proportion of patents abstracted is correctly related to the extraction is shown by the figures of Table V.

The outcome of an extensive study along these lines was, firstly confirmation of the theory that it was possible to relate the amount of patent flour taken off to the length of extraction so that the residual flour was equal to 80 per cent. extraction flour in colour, baking behaviour, and nutritive composition, and, secondly, the establishment of data which enabled a graph to be drawn for the guidance of millers who wished to produce such a simulated National flour.

The graph was only a guide, since the proportion of patent which could be removed from a flour of given extraction in order to leave a simulated National flour would not be the same for all mills.

TABLE V

VITAMIN CONTENTS OF 80 PER CENT. FLOUR AND OF THREE RESIDUAL FLOURS PRODUCED BY ABSTRACTING PATENTS FROM LOWER EXTRACTION FLOURS

	80 per cent. Flour mg/100 g.	*Residual Flour A* mg/100 g.	*Residual Flour B* mg/100 g.	*Residual Flour C* mg/100 g.
Vitamin B_1	0·21	0·20	0·20	0·22
Nicotinic acid ..	1·7	1·7	1·8	1·6
Iron	1·8	1·9	1·9	1·6
Riboflavin	0·06	0·06	0·07	0·06
Biotin	0·002	0·002	0·002	0·003
Pantothenic acid ..	0·36	0·34	0·33	0·36
Pyridoxin	0·21	0·25	0·26	0·24

TABLE VI

MINIMUM, MAXIMUM, AND MEAN VALUES FOR VARIOUS FLOUR PROPERTIES EXHIBITED BY A SERIES OF POST-CONTROL FLOURS

	Minimum	*Maximum*	*Mean*
"White" flours with colour figures of 1·5 or less			
Moisture	13·2 per cent.	15·5 per cent.	14·3 per cent.
Protein	9·58 per cent.	11·12 per cent.	10·15 per cent.
Maltose figure	1·25	2·35	1·70
Grade colour	0·3	1·9	1·0
Bleach figure	0·5	7·0	3·0
Water absorption ..	60	64	62
"White" flours with colour figures of 2·0 or over			
Moisture	13·1 per cent.	15·3 per cent.	14·4 per cent.
Protein	9·75 per cent.	11·00 per cent.	10·37 per cent.
Maltose figure	1·30	1·90	1·65
Grade colour	2·1	4·1	3·0
Bleach figure	1·0	8·0	3·5
Water absorption ..	61	63	62
National flours			
Moisture	13·2 per cent.	15·5 per cent.	14·0 per cent.
Protein	10·26 per cent.	12·48 per cent.	11·01 per cent.
Maltose figure	1·3	2·25	1·65
Grade colour	3·9	6·5	5·2
Bleach figure	1·0	7·0	3·5
Water absorption ..	61	64	62

The deviations should not necessarily be pronounced. When a miller knows how much patent flour he needs to meet the demand of his trade, reference to the graph will reveal the approximate extraction to which he should mill in order to provide the desired amount of patent flour and at the same time leave a residue which can be sold as National flour. The greater the amount of patent required, the lower the extraction to which he should mill. For example, if 10 per cent. of patents is to be extracted then he should mill to about 79 per cent. extraction, while the rate of extraction should be rather less than 78 per cent. if 25 per cent. of patent flour is to be removed.

Quality of Post-control Flours

There should not be great differences between National flours at the present time because even the simulated flours are supposed to resemble 80 per cent. extraction flour in colour, baking quality, and nutritive composition, and different millers' grists show a general similarity. A much wider difference is to be expected between white flours because these may range from short patent flours to straight run flours of, say, 72 per cent. extraction. Since decontrol, numerous mills have produced National flour exhibiting a much brighter colour than that of their pre-decontrol National flours and there is, therefore, more variation between current National flours than was anticipated or can be justified.

The extent of these variations between the flours from different mills is shown in Table VI, constructed from analytical figures obtained in the author's laboratories. The analytical data of 60 white and 60 National flours selected at random from the records for the month of October last were analysed so as to show minimum, maximum, and mean values for various flour properties. For the purpose of this analysis, the white flours were divided into two groups—one embracing flours with colour figures of 1·5 or less and the other containing flours with colour figures of 2·0 or more. Broadly speaking, this grouping separates patent flours (colour figures of 1·5 or less) from straight run 70 to 72 per cent. extraction flours (colour figures 2·0 to 4·0).

The mean grade colour figure for the National flour, 5·2, is sufficiently close to the recommended minimum of 5·5 and is a figure in

keeping with the pre-decontrol standard. Unfortunately, too many National flours are encountered with grade colour figures in the region of 4·0. Such flours most certainly will not attain the nutritive standard laid down for National flour. The situation is owing in part to the improvements which have been made in milling technology, which permit an appreciably whiter flour to be produced at 80 per cent. extraction than was possible when the Conference on the Post-war Loaf made its report; but if the number of National flours which are unduly bright in colour and hence too low in nutrients continues at its present level, it may well be that straight run National flour will be defined by a minimum grade colour figure instead of by a length of extraction.

Effect of Overgrinding and Overtreatment

Some of the very early post-control patent flours gave doughs which were not sufficiently lively and springy; this defect was caused by overgrinding and overtreatment. Millers had become accustomed to grind fairly heavily at the head of the mill in order to achieve their extraction, and the effect of any consequent slight damage which this caused to the top flours was compensated for by the lower grade flours, which were included in the same straight run flour. When such patent flour was removed and used alone, the effect of any overgrinding became apparent.

The overtreatment defect arose from the fact that patent flours contain less protein than National flours but protein of good quality, and consequently require only slight treatment. If rather too much treatment is given to these flours, the effect may not be apparent in the complete straight run flour, which millers were making for 14 years, and yet may show up to disadvantage if the patent divide is baked alone. Some patent flours produced in the early days of decontrol were significantly improved when they were given a rather lighter treatment.

A number of patent flours have exhibited a rather low maltose figure and these would have benefited from an addition of malt flour. In many instances, the maltose figure was not so low that it made the production of satisfactory bread impossible but rather did it offer little, and indeed insufficient, margin of safety against unfavourable fermentation conditions.

Usage of White and National Flours

Before control ended, many guesses were made about the proportion of white flour which would be produced. It was generally agreed that much of the flour produced for the manufacture of confectionery and for biscuits would be white, but opinions differed radically about how much white bread flour would be made. This latter problem embraced not only local preferences but also economic considerations, since bread made from National flour was to be subsidised and hence there would be a price differential between such bread and white bread. When decontrol came, it was found that the demand for white flour varied from baker to baker, even within one district, and it is now clear that the prophecy that the majority of the white flour produced would be used for purposes other than breadmaking has been amply confirmed.

Flour used for the production of confectionery or biscuits has to be significantly weaker and lower in protein content than bread flour, and hence if white confectionery or biscuit flour were taken off as a patent flour, the resulting residual flour could not qualify as National flour. It might resemble the latter in nutrient content but it would certainly be very different from National flour in breadmaking quality and the Flour Order requires that simulated National flour must be "substantially the same nature" as 80 per cent. flour. The answer is to make white flour for confectionery or biscuits by milling a straight run flour of low extraction, say, 70 to 72 per cent.

The price of "white" flour is 5s. per sack above that of National flour, irrespective of the grade of the white flour. Hence, a straight run flour of, say, 72 per cent. extraction with a grade colour of 3·5 costs as much as a top patent with a grade colour as low as 0·5, each of them attracting 5s. per sack more than a National flour of or equivalent to 80 per cent. extraction. The situation is, therefore, very different from that which obtained before the war, when the price of a flour was related to its grade—the duller the flour, the lower its price.

Flour Treatment

Much of our flour is still being treated with Agene, although the number of mills which have changed over to chlorine dioxide, the alternative recommended by the Wilson Jameson Committee, has increased significantly and is still rising. This latter bleacher-improver is very effective and considerably more potent than Agene, but applied in optimum concentration and distributed between the divides in the best manner, it gives a flour virtually indistinguishable in baking quality from a similar flour treated to the optimum with Agene. There is a tendency, however, for the optimum improvement in baking quality to be attained by the application of chlorine dioxide before the full bleach is obtained; hence it is not unusual for a small amount of a supplementary powder bleacher to be used in conjunction with chlorine dioxide.

The type of flour best suited to the plant baker is slightly different from that required for a semi-automatic bakery, the former being rather tougher and less elastic than the latter. This difference can often be obtained by supplementing the gaseous treatment of a flour suitable for a semi-automatic bakery by the addition of a powder improver containing bromate. By such means a miller can produce two types of flour, one suitable for his customers with semi-automatic bakeries and the other acceptable to his plant bakers, by milling one grist only and including or omitting a supplementary powder improver according to the destination of the flour.

Little has been heard of the so-called "batter process" whereby a baker uses untreated flour and obtains the necessary improvement by physical means, but this

is understandable since there are numerous economic and practical difficulties to be overcome before such a process could be adopted throughout the baking industry and a concomitant decline in the standard of bread quality avoided.

Reports have been received from America of two new and novel breadmaking procedures, but as yet there is no indication that they are being applied to any extent commercially. One of them is a continuous process which dispenses with much of the normal bakery machinery, while the other relies on hydrogen peroxide and special enzymic preparations for aeration and flavour.

Quinones and Flour Improvement

In our review of the milling industry for 1952 was recorded the isolation from germ of methoxy-*p*-benzoquinone and 2:6 dimethoxy-*p*-benzoquinone, two substances which acted as flour bleachers and improvers but which could not be used commercially as such because they imparted a pink colour to the crumb of the bread. Investigation into the effects of these and other quinones on flour was continued at the Research Association of British Flour Millers during 1953. Nine out of 12 quinones studied caused some improvement in the baking quality of flour, the effects of chloranil and triacetoxybenzene in this direction being appreciable. All the quinones, however, caused some degree of discoloration in the bread crumb.

Dutch workers in this field had reported in 1952 that germ contained a precursor of methoxy-*p*-benzoquinone and, as a result of a continued study of the problem during 1953, they announced that it was a monoglyceride of methoxyhydroquinone. They suggested that this compound undergoes hydrolysis by glucosidase in the presence of air and the resulting methoxyhydroquinone is then oxidised to methoxy-*p*-benzoquinone.

The acceptance of lower grade divides from flour milled to less than 80 per cent. extraction as National flours, provided they have substantially the same nutrient composition as 80 per cent. flour, gives interest and importance to the problem of the distribution of nutrients throughout the wheat grain. The distribution of thiamine and nicotinic acid had already been studied by microdissection procedures, while information upon the distribution of riboflavin, nicotinic acid, pantothenic acid, and pyridoxin had been collected from analyses of various flour streams.

Work in this field was continued during 1953 by the Research Association of British Flour Millers, both by microdissection techniques and by the analysis of flours, the vitamins covered by the investigation being riboflavin, pantothenic acid, folic acid, biotin, and pyridoxin. The results obtained in this study indicate that the aleurone layer and the endosperm together carry the bulk of the nicotinic acid, pantothenic acid, and riboflavin, while most of the thiamine is to be found in the scutellum and the aleurone layer. The embryo and scutellum contain only a small proportion of the nicotinic acid and pantothenic acid, but account for about 25 per cent. of the riboflavin. It would seem that pyridoxin and folic acid are distributed like the riboflavin, while the distribution pattern of the biotin resembles that of nicotinic acid or pantothenic acid.

A point sometimes overlooked is that the concentrations in which a vitamin occurs in different fractions of the kernel do not run parallel to the proportions of the total amount of that vitamin carried by those fractions. Thus, the endosperm carries over 10 per cent. of the total nicotinic acid content of a wheat grain and the embryo and scutellum each carry only about 1 per cent. of the total; yet each of the latter contains nearly 40 micrograms of nicotinic acid per gram compared with the approximate nine micrograms per gram found in the endosperm. The explanation is that the proportion of the total of a given vitamin carried by any fraction is determined by the potency of the vitamin in that fraction, *i.e.* the micrograms of vitamin in each gram of the fraction, and the proportion of the whole grain which the fraction represents.

Semi-dried Prawns

PRESERVING the catch of nearly 2½ million rupees' worth of prawns from the Malabar and South Kanara coasts of India presents a major problem during the brief fishing season. Hitherto crude beach-drying has been the practice, but a semi-drying process operated by the Fisheries Department of Madras has now been introduced on a large scale.

The prawns are blanched in boiling brine for two or three minutes. After shelling, the flesh is immersed in cold saturated brine for about 15 minutes. The excess brine having been drained off, the prawns are oven-dried, the process being complete when the prawns develop a pink colour and a rubber-like texture. This corresponds to a moisture content of about 45 per cent.

Tests have shown that the blanching process alone reduces bacterial count by 98 per cent., and if as little as 0·75 per cent. of ascorbic acid is added to the brine, the reduction is raised to 99·93 per cent.

The risk of the development of mould growth on the semi-dried product is one that cannot be ignored. In this respect, tests have not confirmed the three months' keeping period that has been claimed; two months would seem a safer maximum period. Drying to yield a product of harder texture with about 22 per cent. moisture is much preferable; the keeping period with freedom from fungal attack is then extended to rather more than four months.

FUTURE ARTICLES

AMONG the articles to be published in forthcoming issues of FOOD MANUFACTURE are the following: A description of an Irish quick freezing plant, "The Vitamins," Part II, "Food Packaging," and "Beet Sugar Refining in the U.S.A.," Part II.

Out on location, a bee farmer has set down some of his 70 hives.

Australian Honey

P. D. Mantle

Although not so distinctive as the heather honey of Scotland or the saffron honey of Kashmir, the Australian product has an elusive flavour of its own which comes from the eucalypts, the gum trees, whose blossom is the main source of nectar, those most favoured by apiarists being the Yellow Box, Mugga Ironbark, and the Stringy Bark. Many full-time professional beekeepers find it worth their while to transport their hives and equipment around the countryside to those regions where the trees bloom the best. Such men, in a favourable season, might take as much as 500 lb. of honey from a single hive.

PROFESSIONAL beekeepers, who are responsible for most of the production of Australian honey, need to maintain a high rate of production from each hive in order to make honey their sole source of income. They make a study of the seasons and flowering times in different parts of the country, by keeping in touch with the various Departments of Agriculture.

In the year ended June 30, 1953, there were estimated to be about 7,000 apiarists whose activities were such that statistical returns had to be made. Between them, they had about 305,000 productive and 100,000 unproductive hives. Since the first year of the war, average production has varied from 52 lb. to 138 lb. of honey from each productive hive. Production of beeswax in 1952-53 was about 360,000 lb.

The mobile honey extracting unit is equipped with a rotary extractor, the power for which is supplied by a single cylinder 1 h.p. petrol motor. The steam for the decapping knife comes from a boiler outside.

The farmer removes the wax cappings from the combs.

The hives are steel-strapped prior to transport.

Before the war, Australia did little more than produce enough honey for her own needs, but migratory bee farming began to take on and the trend continued after the war. This greatly increased the total production of honey, but home consumption, though increased by the flow of immigrants, did not keep pace. In 1952-53, Australia exported 16,612,683 lb. of honey at an average price of about 11d. a lb. The United Kingdom was the main customer, taking 15,137,152 lb. costing £673,828. The Western Zone of Germany took 733,814 lb., and the remainder went to a variety of overseas markets.

Unlike the United States of America, Australia does not subsidise her honey exports. The overseas price is lower than the price for home consumption; equalisation schemes operate by which the high and the low priced markets are shared between producers. South Australia is the only State with legislative power over honey acquisition and marketing, but voluntary organisations operate in other States to average out the producer's return.

How much honey Australians eat is not easy to compute, as there are varying carry-overs from one season to another, but the amount is small. Each year, Australians eat something like 1·3 lb. of honey per head, including the honey used in confectionery and liqueurs. On the home market, it can be bought in 4 gal. and smaller tins, jars, and waxed cartons, and is available as clear or candied, with or without a section of comb in it.

The main producing States are New South Wales, Victoria, and South Australia. As honey sources are as much as 3,000 miles apart, the flavour and colour vary according to the type of flora visited by the bees; but in preference to marketing special lines, packers usually make up standard blends achieved by a selection of the honeys used, although a few select lines are marketed. In general, Australian honey has a very high sugar content.

The honey-producing season is from October to March, which in Australia is from the middle of spring to the beginning of autumn. The peak production year since 1938 was in 1948-49, when the total output of honey in Australia was 53,203,000 lb.

Apiary Practice

Apart from the substantial element of migratory bee-keeping, apiary practice in Australia is very much the same as in other countries. The majority of hives are of the square box variety, averaging 18 in. square and 24 in. high, with a removable roof and vertical frames held by runner guides attached to the walls of the hive. They are usually mounted on legs and equipped with some device to prevent the entry of ants. A landing platform is provided at the entrance to the hive which is usually a slit extending the width of one side.

The Italian type of bee is most common in Australia, and from time to time queens are imported, but the mating habits of bees

(*Continued on page 112*)

Abstracts From Recent Food Literature

The Banana Industry in Cuba.—Banana Products. J. J. Franco-Bétancourt (*Fruits*, 1953, **8,** 502).—Plans are being made in Cuba to industrialise banana production by preserving the fruit in some form. In this connexion, one of the problems to be solved is that of rancidity which can be obviated by means of antioxidants. Experiments are being made with heat-treated banana chips and different kinds of antioxidants. Other experiments are concerned with the preservation of banana in powder form. In this case, the main problem is to prevent the browning of the product and the loss of the ascorbic acid content. Experiments are also being made with banana preserves and other banana products.

Causes of and Remedies for the Darkening of Canned Shellfish. M. Boury (*La Revue de la Conserve de France et de l'Union Française*, 1953, **8,** 55).—Canned shellfish are apt to acquire a dark colour owing to the formation of a metallic sulphide which, though harmless, tends to reduce the commercial value of the product. The hydrogen sulphide comes from the protein molecule of the shellfish meat which is particularly rich in sulphur, and is released mainly during the sterilisation. The blackening process is accelerated by alkalinity but held up by acidity. To avoid this blackening, it is necessary (1) to use, exclusively, live or deep-frozen animals; (2) to speed up the manufacturing process as much as possible; (3) to pay utmost attention to hygienic conditions during the manufacture; (4) to avoid the use of iron or copper utensils which are not completely rustproof; (5) to keep the shellfish meat in a slightly acidified agent, using *e.g.* vinegar or citric acid; (6) to use cans with an internal anti-sulphur lining.

Disposal of Slaughterhouse Waste. G. Wagner (*Die Fleischwirtschaft*, 1953, **5,** 325).—A new type of machinery, known as Condux trituration plant, has been successfully tried out at Hanau. The machine is able to break up hard matter like bones as well as adhesive and elastic matter like guts, and to deal with various residual matter. Major metal parts are normally kept out by means of a magnet, but such parts as earmarks, nose rings, etc., will not harm the machine which normally requires but a fraction of its installed power of 15 h.p.

Refrigeration in Chocolate Factories. A. Leupold (*Gordian*, **53,** 11).—Several different cooling systems which have been specially adapted for use in chocolate factories in recent years are described. The opinion is expressed that the use of several smaller cooling aggregates per storey may prove to be more economic.

The Filtration of Refined, Warm, and Cooled Edible Oils. H. Wilke (*Fette und Seifen*, 1953, **55,** 801).—Turbidity-causing constituents of some kinds of edible oils have been subjected to laboratory tests in order to examine their influence on the filtering process. Filtration results can be improved by various means, dependent on the temperature of the oils. A particularly efficient means is the use of kieselguhr (diatomaceous earth), which is discussed at length.

The Application of Impulse Rendering to the Animal-Fat Industry. I. H. Chayen and D. R. Ashworth (*J. Appl. Chem.*, 1953, **3,** 529).—The impulse rendering process, which consists in mechanical rupturing of membranes of fat-containing cells by high speed impulses transmitted through the medium of a liquid, has been developed mainly for degreasing animal by-products in such a way as to preserve the quality of the fat and protein. The degreasing of bone and soft fat is described in detail, and brief reference is made to possible applications in the recovery of oils from fish, fish livers, vegetable, fruit, and seeds.

The Quality of Cereals and their Industrial Uses. J. B. Hutchinson (*Chem. and Ind.* 1953, June 13).—Factors affecting the suitability of oats for processing are described.

Theory of Mixtures and Mixing. P. V. Danckwerts (*Research*, 1953, **6,** 355).—The first of a series of articles in which the mixing theory is reviewed and some possible future developments are suggested.

Water Chlorination Research. E. A. Whitlock (*Mun. Engg.*, 1953, **130,** 1343).—A study of the extensive application of water chlorination dealing with the use of chlorine in water treatment since its introduction 50 years ago.

An Air Blast Freezer for Research. R. L. Mutch and G. C. Eddie (*Mod. Ref.*, 1953, **56,** 234).—The experimental air blast freezing tunnel erected at the Torry Research Station, Aberdeen, Scotland, for studies on fish freezing is described.

Fish Handling and Processing in Europe—Salting and Drying Cod and Allied Species. W. A. Empey (*Fisheries Newsletter*, 1953, **12,** 8).—A description is given of the preparation of good quality stockfish and of salted and dried white fish.

New Coating Process traps Full Flavour. G. Wellner (*Food Engg.*, 1953, **25,** 94).—The Sealva process ensures increased flavour retention in pre-mixes, beverage powders, packaged desserts, and confections. It consists of converting the liquid flavour into minute droplets which are in turn coated with a controlled thickness of natural gum. The gum is impervious to oxidation and evaporation as long as the product is maintained in a relatively anhydrous state; yet it is instantly dissolved in water.

Oxidative Faults of Cold Storage Butter. N. Petersen (*Fette und Seifen*, 1953, **10,** 712).—During the cold storage of butter, bacteriological faults are largely inhibited, but chemical faults are not. These are influenced by many factors, including light, temperature, water, air, acids, antioxidants, etc. Oxidative faults can be countered, *e.g.* by more intensive pasteurisation, by restricting the access of light and

air, by reducing the acidity, by adding special salts, etc. The last-named remedy can be particularly efficient but requires detailed technical knowledge; insufficient or belated admixture may, according to Swedish experience, introduce an oily taste. The Swedish Dairy Research Institute has carried out systematic research on this and other processes designed to eliminate oxidative faults in long-keeping butter.

The Cultivation and Marketing of Pepper. E. Brown and D. E. Reader (*Colonial Plant and Animal Products*, 1953, **3**, 195).—A survey of the propagation, cultivation, harvesting, preparation, and marketing of black and white pepper.

The Australian Sugar Industry. T. A. G. Hungerford (*World Crops*, 1954, **6**, 55).—The development of the sugar industry in Queensland, Australia, during the past 80 years is described and details are given of preparation and planting, cultivation and harvesting, milling procedures, and the use of by-products.

Fuel Oils: Their Efficient and Smokeless Combustion. K. H. Sambrook (*Petroleum*, 1954, **17**, 56).—The two major problems in fuel utilisation today are conservation of fuel resources and reduction of atmospheric pollution. The article describes the extent to which these objects are achieved in the burning of fuel oils, indicates standards of cleanliness and efficiency to be attained by any well-designed and well-maintained oil burning plant, and summarises possible causes of substandard performance.

Substances Responsible for the Odour of Dried Milk Products. Shtal'berg and Kretovitch (*Molochnaya Prom.*, 1953, **14**, 27).—In studies on the contribution to browning of protein and the production of specific flavours in the presence of milk sugar, solutions of flavour-bearing milk powders were distilled at 35° to 40° under reduced pressure, the distillates being received in a refrigerated flask. These distillates were found to contain aldehydes and amines and the *p*H was lower than in fresh milk powder distillates. On the other hand, the nitrogen and ammonia contents and the oxygen adsorption were all higher. It is therefore concluded that the cause of deterioration in such powders lies in a reaction involving the amino group of the protein and the aldehyde group of the lactose. The injection of sulphur dioxide into the powder prior to storage will suppress both the browning and production of unpleasant flavours for at least 12 months.

The Separation of Rodent Hairs and Insect Fragments from Oat Products. H. V. Hart and A. M. Heighton (*Anal.*, 1953, **78**, 439). A modified method for the examination of oatmeals and rolled oats for rodent hairs and insect fragments which gives cleaner separations of extraneous matter from fine, medium, coarse, and "pinhead" oatmeal and oat flakes is described

Selection of Groundnuts. P. Larroque, J. Chausson, Ph.Galland (*Oléagineux*, 1954, **9**, 1).—A brief report is presented on a large scale experiment, carried out at several African stations of the French Research Institute for Oils and Oil-yielding Plants, on the selective cultivation of groundnuts over a period of several years, covering three or four generations and many thousand specimens of the plant. Through meticulous observation and analysis of the morphological and physiological characteristics of 600 selected specimens, certain hereditary groups were selected, and three varieties cultivated. With one of these varieties, it has been possible to double the crop per acre within three years.

The Fight against Cercospora Musae in the Banana Plantations of Guadeloupe. H. Guyot (*Fruits*, 1953, **8**, 525).—Trials have been carried out by the Antilles Station of the *Institut Français des Fruits et Agrumes Coloniaux* on methods of combating the harmful cercospora fungus affecting the Guadaloupe banana plantations. The most efficient means was found to be a fortnightly "fogging" of the plantation with a spraying mixture containing oil and either copper oxychloride or a zinc compound (bi-ethylene dithicarbamate of zinc). Ways of reducing cost of treatment are being studied.

AUSTRALIAN HONEY

(Continued from page 110)

make it difficult to maintain the purity of any desired strain. There have been some recent developments in the artificial insemination of queen bees to maintain better control of purity of strain and to aim at the development of desirable qualities and swarming habits. Equipment for artificial insemination has been imported from the United States by the Department of Agriculture in New South Wales. This is supplemented by such items as dissection microscopes, carbon dioxide equipment, and non-heating microscope lights to equip Glenfield Veterinary Research Station, where work, aimed at improving bee strains, is proceeding.

Itinerant Apiarists

Probably the most interesting feature of the Australian honey industry is the group of itinerant apiarists. It was the sudden increase of these producers, with their high rate of output, that made the industry more concerned with export than with home consumption. They have to operate on a large scale, for their costs are obviously higher than those of farmers who work from fixed locations.

When the blossom within bee-flight has been worked out, the migrant apiarist loads his hives on to motor trucks, packs up his robbing, extracting, and heating equipment, stocks the caravan with food for himself and possibly his family, and sets off to the next stand. Once there, he sets out his hives and releases the bees. As a rule the bees have no great difficulty in finding their hive in its new location; so long as the queen remains in the hive they will return to her.

While the bees work there is plenty to keep the apiarist occupied, for he must set up his equipment at the new site, including the honey house which he needs to make bee-proof to forestall possible robber bees. If the season is good he is kept hard at work robbing each hive as often as once in each 10 days. "It's a good life," they declare.

News from the Industry

FORTHCOMING EVENTS

The Institute of Refrigeration

A discussion on "The Control of Relative Humidity in Cold Stores," with papers by M. E. Anderson and G. Mann, will be held by the Institute of Refrigeration on March 16 at the Institution of Mechanical Engineers.

*

The Royal Society of Arts

Sir Ben Lockspeiser, Department of Scientific and Industrial Research, is to give the Special Bicentenary Lecture before the Royal Society of Arts on March 24. His lecture will be entitled "Manufactures, 1754-1954."

*

The Society for Analytical Chemistry

The Annual General Meeting of the Society for Analytical Chemistry will be held on March 3 at 4.30 p.m. in the Meeting Room of the Royal Society, Burlington House, followed at 5 p.m. by the Bernard Dyer Memorial Lecture given by Dr. E. B. Hughes.

*

The Royal Sanitary Institute

Among the papers to be read at the Sunderland Sessional Meeting of the Royal Sanitary Institute to be held on March 5 are the following:

"Modern Developments in the Examination of Food and Drugs," by W. G. Carey.

"The Bacteriological Side of Food Poisoning," by P. B. Crone.

*

The Chemical Society

The Anniversary Meetings of the Chemical Society are to be held in Manchester on March 31 and April 1. In addition to the symposium "Dynamic Stereochemistry," the Liversidge Lecture "Organometallic Compounds containing Fluorocarbon Radicals," and the Anniversary Dinner, visits have been arranged to the Shell Petroleum Co., the Thornton Research Centre, the Stanlow Refinery, the British Rayon Research Association; Chloride Battery Co., and Imperial Chemical Industries, Dyestuffs Division.

*

The Society of Chemical Industry

The Chemical Engineering Group and the Food Group of the Society of Chemical Industry are arranging a conference on "Chemical Engineering in the Food Industry," to be held at the Wellcome Research Institution, 183-193, Euston Road, London, N.W.1, during March 18-19.

On March 10, the Food Group are holding a joint meeting with the Yorkshire Section when Dr. A. G. Lipscomb will give a paper entitled "Unsolved Problems in the Production of Food — 3. Chocolate."

The Annual General Meeting of the Nutrition Panel will be held on March 24.

The summer tour of the Food and Agriculture Groups of the Society of Chemical Industry will take place this year in Austria, and will include visits to places of industrial, scientific, and general interest in and around Innsbruck in the French Zone. It is hoped to make alternative air or sea and rail travel arrangements.

The intention is that the party travelling by air shall leave London on Saturday, May 22, and return on Saturday, May 29, and that the party travelling by sea and rail shall leave London on Friday, May 21 and return on Sunday, May 30.

*

Managing the Small Firm

A second Conference for Small Firms has been arranged from March 5 to 7, 1954, at Ashorne Hill, Nr. Leamington Spa. This year the Federation of British Industries has joined the original sponsoring organisations who were the British Institute of Management, the Midland Region of the National Union of Manufacturers, and the Birmingham Branch of the Institute of Industrial Administration.

The subjects chosen cover a wide range of management subjects, including finance, standardised costing, work study, export marketing, and organisational problems caused by expansion.

*

The Nutrition Society

The Nutrition Society is holding a symposium at University College Hospital Medical School, London, W.C.1, on Saturday, March 13, commencing at 10.30 a.m., on "Some Problems in Nutrition."

The chairman will be Prof. S. J. Cowell and the following contributions have been arranged: "The Gluten-free Management of Coeliac Disease," by Dr. D. Lawson, "Clinical Stigmata of Nutritional Deficiency," by Dr. R. Passmore, "Infant Feeding Practices," by Prof. B. S. Platt, and "Some Statistical Aspects of Nutrition Surveys," by Dr. B. Woolf.

*

Electrodeposition and Metal Finishing

The Fourth International Conference on Electrodeposition and Metal Finishing will be held in the Crown Room suite of the Holborn Restaurant, London, from April 20 to 24, and will comprise a comprehensive series of technical sessions, works visits, and social functions.

Institute of Physics

At the Institute of Physics' Conference on "The Physics of Particle Size Analysis," to be held in Nottingham from April 6 to 9, 1954, the following sessions have been arranged: the motion of particles in fluids; the scattering of light by particles; the general phenomena encountered in particle size analysis; the comparison of methods and the automatised methods of particle counting and sizing.

*

The Royal Institute of Chemistry

The Anniversary Meetings of the Royal Institute of Chemistry will take place at Cambridge from April 8 to 10, during which the 76th Annual General Meeting of the Institute will be held. Sir Harry Jephcott will deliver the Presidential Address entitled "Biosynthesis and the Chemist," and medals and other awards will be presented. Among other activities will be a reception and dance, and visits to industrial establishments and Colleges.

*

Engineers' Conference

The forthcoming annual Engineers' Conference of Spirax-Sarco, which will occupy four full days of business sessions, is to be held at the Palace Hotel, Buxton, from April 12 to 15. Technical papers and discussions will range over a considerable field, including subjects such as hot-air drying installations, condensate drainage, and air venting of steam-heated drying cylinders of various types, heating and process steam considerations at breweries, gas works, and hospitals, and the simplification of thermostatic control problems in steam and hot-water installations and certain low temperature plant.

Aspects of industrial fuel efficiency and production economy dealt with in the new 32-page bulletin "Steam for Process," issued by the company, will be explored further by the assembled engineers and technical staffs.

The proceedings will be opened by Mr. H. Alwyn Smith, and the Conference chairman will be Mr. L. G. Northcroft, O.B.E. (joint managing directors of the company).

R.S.I. Honours

His Grace The Duke of Norfolk, K.G., P.C., G.C.V.O., and Major-General The Right Hon. The Earl of Athlone, K.G., P.C., G.C.B., G.C.M.G., G.C.V.O., D.S.O., F.R.S., have accepted election as Vice-Presidents Emeriti of the Royal Sanitary Institute, an honour conferred upon them by the Council of the Institute.

Mr. W. Leonard Hill (*left*), **Mr. E. Gurr** (*centre*), **and Mr. R. Thixton at the Victoria Docks.** *Leonard Hill photo.*

Large Export for Technical Book

The Chairman, Mr. W. Leonard Hill, and the Export Manager, Mr. R. Thixton, of Leonard Hill Ltd., had the pleasure of taking the author of one of the books they handled, Mr. Edward Gurr, to the Victoria Docks recently to show him the shipment of his book on its way to the United States. Not all the consignment is seen in the illustration, and while this single order may not be a record, it is certainly unusually large for one particular book.

Mr. Edward Gurr, F.R.I.C., F.R.M.S., F.L.S., the author of the book "A Practical Manual of Medical and Biological Staining Techniques," is one of the world's leading authorities on biological stains and reagents. He is the founder and managing director of Edward Gurr Ltd., of East Sheen, London, the makers of Michrome biological stains and reagents. These highly specialised products, which are exported to all countries of the world, are essential for the study and control of diseases in humans, animals, and crops. Mr. Gurr is held in high esteem by medical and biological research workers who seek his advice on the use of these microscopic reagents.

Expansion in Paper Products Trade

Sir Robert Barlow, chairman of the Metal Box Company, announces that the Metal Box Company has made an offer to the shareholders of Brown, Bibby and Gregory to purchase their shares in the company.

Mr. Robert Gregory has resigned his position as managing director of Brown, Bibby and Gregory to take up an appointment as managing director of Dobeckmun Overseas, but he has agreed to make himself available to the company in a consultative capacity for a period of two years.

Mr. J. K. Bibby will continue as a director of the company and will also be joining the Board of the Metal Box Company.

Messrs. R. Ambler, L. H. Brown, M. Brown, H. S. Jennins, and K. K. Davies will continue as directors of the company and Mr. Ambler is also appointed as general manager.

Mr. David Ducat, vice-chairman and managing director of the Metal Box Company will join the Board of Brown, Bibby and Gregory and will become its chairman.

The Metal Box Company wish to state that its policy will be to employ its resources and experience to develop and extend the business of Brown, Bibby and Gregory at Speke under its present management.

The business of Brown, Bibby and Gregory is that of colour printers and manufacturers of paper and board containers, can labels, paper bags, and speciality containers in foil and film laminates.

The Metal Box Company already conducts a considerable business in paper products. Their new acquisition will permit them to expand their range of production and thereby to extend the packaging service which they offer to their customers.

Long Service Awards

The sales conference held by National Adhesives and attended by all their sales staff in the U.K. culminated in a staff dinner and dance at which a number of anniversaries were celebrated.

Ronnie Francis, managing director, was presented with an inscribed gold watch to celebrate 25 years with the company, and long-service pins were presented to Miss D. J. Jardine and Mr. C. W. Dunningham (20 years); Mr. R. Anscombe (15 years); Mr. J. B. Hallifax (10 years); and Mrs. G. Moffett and Miss A. Gilder (five years).

*

For the third successive year, the Twenty-Five Years Club of Pressed Steel Company have held their dinner, the function taking place in the ballroom of the factory at Cowley. Members of the Club consist of directors, executives, and works and office employees who have been in the company's service for an uninterrupted period of at least 25 years. At this year's dinner, 100 persons qualified for membership. The total to date of 328 people forms a record of long service.

As Major Albert Pam, O.B.E., M.A., and a founder member, was unable to make the presentations through indisposition, Mr. A. L. Shuttleworth, managing director and founder member, welcomed the guests and presented silver enamel club membership badges and gold watches to each of this year's new members.

APPOINTMENTS AND RETIREMENTS

Mr. W. J. Wardell has been appointed manager of the dried fruit and nuts department of S. Daniels and Co.

*

Mr. G. Lloyd Jones has been appointed manager of the Cardiff District Office of the British Thomson-Houston Company in succession to Mr. A. F. MacCarthy, M.I.E.E., who is retiring.

*

Following the taking over of a new factory at Chesham, Bucks., Van Houten announce that Mr. E. Harrison has been appointed factory manager.

*

It is announced that Mr. H. J. Palmer, F.R.I.C., has been appointed a director of Swift and Co. He joined the company in 1926 and for many years has been in charge of the company's cheese factory.

*

Mr. R. C. Blunt.

Following the retirement of Mr. S. G. Bailey, O.B.E., as Secretary of the Cake and Biscuit Alliance, the appointment of Mr. Roger C. Blunt, the Assistant Secretary, has been announced. At the same time, Mr. Blunt has been appointed Joint Secretary of the National Joint Wages Council for the biscuit industry and Secretary of the British Cake and Biscuit Association.

*

Following the retirement of Major V. R. Barron, the Purdy Machinery Co. announce that Mr. K. G. Buckley, Managing Director of their Associated Company, Farrow and Jackson, has now been appointed managing director of Purdy Machinery Co.

*

Mr. B. A. Robinson, M.I.E.E., M.I.Mech.E., who has been with the Cambridge Instrument Company for 41 years, and their district representative for 32 years in the Newcastle-on-Tyne area, has now retired. He is succeeded as district representative by his son, Mr. W. E. Robinson.

*

The retirement of Mr. J. Beaumont as representative for their north and west Lancashire areas has been announced by Hopkinsons, although his services will be retained in an advisory capacity until later in the year. Mr. Beaumont has completed nearly 62 years' service with the company, thus almost equalling the achievement of his father who also represented Hopkinsons and remained with the firm for 63 years.

Mr. Beaumont is succeeded as representative in this area by Mr. G. Stevenson.

Mr. Leonard Hill's American Tour

Mr. W. Leonard Hill, chairman of Leonard Hill Limited, publishers of FOOD MANUFACTURE and the 11 other journals comprising the Leonard Hill Technical Group, is making a tour of the West Indies and the United States. He arrived in New York on February 8 and from there went to Nassau in the Bahamas. He left Nassau on February 22 and arrived in New Orleans on February 23. He then went to Houston, Texas, and proceeded by way of Dallas and Tulsa to Knoxville, Tennessee, arriving on March 2. He will return to New York on March 6, returning to England on April 1.

While in New York, Mr. Hill can be communicated with c/o Norris Evans, 92, Lorraine Avenue, Upper Montclair, New Jersey.

Tour to the Caribbean

A four months' tour of the Caribbean area is being made by Mr. T. H. Hilton of Joseph Crosfield and Sons in connexion with the sale of sodium silicate, the washing detergent "Solgon," and allied products.

Mr. Hilton, who previously visited this area in 1950, will call upon users and potential users to offer technical advice and assistance with the object of further expanding the company's export sales.

Countries included in the tour are Jamaica, Barbados, Trinidad, British Guiana, Suriname, Venezuela, Netherlands, Antilles, Panama, Costa Rica, Nicaragua, Salvador, Guatemala, Bahamas, and Bermuda.

Mr. Reavell Visits S. African Plants

Following his visit to South Africa in January, 1953, Mr. J. Arthur Reavell, M.I.Mech.E., M.I.Chem.E., F.Inst.F., F.I.M., chairman of Kestner Evaporator and Engineering Co., is now making a further visit to the Union and also to Southern Rhodesia.

The activities of Kestners (S.A.) (Pty.) have continued to increase during the past year and during his visit Mr. Reavell will call on many old friends in the process industries where the company's plants have been installed and put into commission; he will also visit plants at present under construction, including milk condenseries and fruit juice concentration plants.

Increasing Essential Oil Exports

Mr. J. L. Hindle, B.Sc., managing director of Standard Synthetics, recently made a three weeks' business trip to the United States. In New York, Mr. Hindle conferred with Berje Chemical Products Inc., the U.S.A. agents for Standard Synthetics, and it is hoped that this visit will result in increased exports of essential oils, aromatics, by-products, and specialities to the United States.

Congratulations

Congratulations to our colleague, Mr. W. G. Norris, editor of *Manufacturing Chemist* and *Chemical & Process Engineering*, on the birth of a son on January 4.

Heavy Demand for Sweets

"More variety and better service" was the promise of Mr. G. Kenneth Horner, 28-year-old managing director of George W. Horner, the County Durham sweet manufacturers, when it was officially announced that sugar was to be taken off the ration.

To meet the resulting heavily increased demand, both at home and abroad, production at the five-acre sweet factory at Chester-le-Street has been increased by the introduction of a double-shift for a five-day week, with normal working hours on Saturdays. The factory is therefore in full production daily from 6 a.m. until 10 p.m.

Society Changes Name

At an Extraordinary General Meeting of the Society of Public Analysts and Other Analytical Chemists held in London, the name of the Society was changed to The Society for Analytical Chemistry.

The Society of Public Analysts was founded at a meeting held on August 7, 1874. Membership was then restricted to practising public analysts and their assistants, but in course of time analytical chemists, other than public analysts, were also admitted as members. When, on August 7, 1907, the Society was incorporated, its extended membership was recognised by the adoption of the title "The Society of Public Analysts and Other Analytical Chemists."

Even then there were doubts about the suitability of this title, and today the Society has far outgrown its original purpose of looking after the professional needs of the public analysts. The continued growth of the Society and the varied interests of its members have convinced the Council that its functions in the matter of the professional needs of analysts would be very much better discharged by the newly formed Association of Public Analysts and the Royal Institute of Chemistry.

The spirit of the Society has not changed, but there is no doubt that the quarters into which its interest has been directed have been altered. The developments in analytical chemistry have been so vast and striking in this period that the Society has had to grow in order to accommodate them. While the Society's interest extends over the whole range of natural and manufactured products, there will still be the same platform for the discussion of investigations into the composition of food and drugs.

The Council has for some time past considered the needs of young chemists and, with the object of encouraging them, a class of Junior Membership has been instituted for chemists aged between 18 and 27 years. Junior members will pay a considerably reduced subscription and no entrance fee, and will receive *The Analyst*.

There is every intention that the character of *The Analyst* and of the ordinary meetings of the Society will be maintained unchanged. The Society for Analytical Chemistry will continue in the tradition of encouraging, assisting, and extending the knowledge and study of all questions relating to the analysis, nature, and composition of natural and manufactured materials generally.

The new band-box type of gift drum for Peek Frean's cheese wafer sticks designed by Richard Lonsdale-Hands Associates.

OBITUARY

Mr. Christian Kunzle, head of the confectionery firm of that name, on January 10, aged 74 years.

Born in Davos, Switzerland, in 1879, Mr. Kunzle left home at the age of 17 to come to Britain. His first job in England was in the Corn-market, Oxford, where his mother's brother had a pastrycook's business, a flourishing establishment well known to undergraduates at the turn of the century.

He decided to set up in business in Birmingham and, from the first, the business prospered; Mr. Kunzle's confectionery became known throughout the Midlands and later all over the country.

In 1935, he gave the chateau at Davos, which had been built by his uncle, and £10,000 for the establishment of the Alpine Homes for sick people. The welfare work done at Davos was the chief interest of his later life. Many members of his staff in need of a rest and holiday have stayed there and thousands of sick children from Birmingham and the Midlands have benefited from visits.

Change of Address

The addresses of the Cake and Biscuit Alliance Ltd., and of the British Cake and Biscuit Association is now:

157 Victoria Street,
London, S.W.1.

The telephone number is TATe Gallery 3601, telegrams Cabiscal, Sowest, London.

Woven Wire

Screening, grading, and filtering are some of the operations in the food manufacturing industry for which woven wire screens can be used. For the flour milling industry, tinned mill screens are woven in steel wire and coated with tin to prevent rust. Woven wire rice mill cloth is also available with either square or elongated openings. The manufacturers, G. A. Harvey and Co., are pleased to advise on the special problems that arise in connexion with rice cleaning, grading, and screening operations.

The company also supplies various types of filter and strainer and all kinds of wire cloth, manufactured in copper, brass, phosphor-bronze, Monel metal, etc., suitable for any type of filter.

A new catalogue issued by the company itemises the wide range of products manufactured.

Speedfix Vinyl Tape

Made on a transparent polyvinyl chloride basis, the new Speedfix self-adhesive has great tensile strength and is practically impervious to moisture. As proved by tests, the product, which is C.C.I. and A.I.D. approved, withstands complete immersion in water.

Manufactured by Industrial Tapes, its technical specification is:

Physical Properties	*P.V.C.*
Tensile strength ..	22 lb.
Per cent. elongation	30-40 per cent.
Total thickness ..	2·8 thou.
Moisture vapour permeability at 40°C.	27 g.s.m. per day
Water absorption	Negligible
Chloride	Below ·05 per cent.
Sulphates ..	Below ·025 per cent.
Insulation resistance	Minimum 20,000 megohms.

A New Ceiling Fitting

Designed for rapid and easy fixing at any centre from 36 in. to 51 in., a new ceiling fitting for fluorescent lighting has all its control gear and wiring mounted on an independent gear chassis extending the full length and width of the reflector covers. This arrangement lends to the fitting of a smooth, clean line, unmarred by a projecting starter switch.

Although designed for flush ceiling mounting, it can also be suspended by chain or by conduit. In addition, provision is made in the centre of the gear chassis for B.S.S. conduit box fixing, and for cable entry.

Manufactured by Philips Electrical, the Athlone, which measures 64⅜ in. long by 3⅜ in. wide by 5¼ in. deep over lampholder covers, is finished in high-grade white stove enamel.

Testing Essential Oils

B.S. 2073 Methods of Testing Essential Oils has just been published by the British Standards Institution. The document describes the preparation of the oil for examination and gives methods of determination for: specific gravity and apparent density (weight per millilitre), optical rotation, refractive index, freezing point and melting point, solubility in alcohol, acid value and ester value, ester after acetylation, citronellal, aldehydes other than citronellal, carbone and menthone, and phenols.

It is hoped at a later date to issue an addendum including some of the methods which it has not been found possible to standardise at the present time.

Artificial Coffee Essence

In the 1930's it was discovered that furfurylmercaptan was the active flavouring principle of extract of coffee. Furfurylmercaptan, however, is subject to the same decomposition (oxidation) which affects roasted coffee and its extracts during prolonged storage.

Decomposition of artificial essences was in fact more rapid in spite of the addition of antioxidants with which the essence very frequently formed new chemical bodies, while the antioxidants contained in the natural coffee often proved more suitable and effective.

Realising these handicaps, Th. Muhlethaler Co., Ltd. in Nyon, Switzerland, have undertaken extensive research in order to produce an artificial coffee essence of greater stability; in order to achieve this, furfurylmercaptan was completely discarded as an ingredient, and chemical bodies of a greater stability have been synthesised which can be employed without fear of deterioration through oxidation.

This compounded essence is being marketed under the name of Moka 889.

This product should be used in a concentration of 1:1,000 in boiled sweets. For fondants and soft centres, the concentration should be reduced to about half.

It shows remarkable stability and resistance against heat and should prove interesting as a raw material in confectionery manufacture and for all other purposes where a true and stable coffee note is required. Samples can be obtained from Gale and Mount.

Food by Slot Machine

A refrigerated, automatic, coin-operated vending unit, capable of operating 24 hours a day, has been designed and developed with the object of overcoming two difficulties encountered by the ice cream distributing trade: the reduction of labour costs in selling and an accurate return of cash from sales.

The commodities which can be sold from the machine include ice cream, quick frozen foods and, in hot climates, such items as chocolates, butter, and lard.

Designed and patented by Ice-Matic, Ltd., the machine is made by Peerless and Ericsson and refrigerated by Frigidaire.

Fitted with an outer cabinet in sheet steel and rust-protected before stove-enamelling in a two-colour design, the machine has a maximum capacity of 250-300 normal sized ice cream brickettes and can be placed in outside locations without fear of undue deterioration owing to weather.

It is electrically refrigerated by means of the metermiser — a sealed rotary condenser unit — and uses less current than an ordinary light bulb.

The coin mechanism is a self-contained unit which can either accept up to six pennies or sixpences or shillings and is designed to return, without damaging the machine, any bent or spurious coins inserted by the user.

The Ice-Matic vending machine—refrigerated, automatic, and coin-operated—sells ice cream and suitably packed frozen foods 24 hours a day without a sales staff and without overheads.

Warm Air Towels

A great deal of infection is capable of being passed on by workers in the food retailing industries by the use of a communal roller or other towel, or by one that is used over and over again by the same person. Such infection can be overcome by the use of the Handy-Andy warm air machine, made by Quiz Electrics.

Additional protection is given by means of a mildly perfumed disinfectant vapour circulating from a moistened pad in the air stream. This also prevents chapping of the skin through over-drying.

Hygiene in the Factory

By the use of Homacol liquid soap and dispensers, every food factory worker is assured of a supply of uncontaminated soap, obviating the dangers of infection always present with the communal use of tablet soap.

In the bigger factories where a large number of wash basins are in use, the Pluto pipeline system is particularly applicable. By this method, soap is served to multiple points from a central container and a series of dispensing valves replaces the more familiar dispenser.

Other products from the works of The Horton Manufacturing Co. are detergent fluids and powders, scouring powders, degreasing compounds, disinfectants, and floor cleanser and sweeping compounds.

Emulso-Plastic Paint

Decorative treatment for all places where food is handled can be achieved by the use of Fabriguard Emulso-Plastic paint. Rapid drying allows two coats to be applied the same day and complete week-end decoration has become a practical proposition. This paint does not contaminate food or liquids by smell or chemical action, is resistant to alkaline and acid conditions, proof against petrol and oil, and the "bleeding" of bitumen and creosote. Washing (or scrubbing) can be repeatedly carried out and application can be made over surfaces normally considered difficult of paint treatment, *e.g.* limewash, distemper, new plaster, asbestos, wallboard, and brickwork.

Available in white and an attractive range of pastel colours, the paint can be supplied in either flat interior finish or porcelain gloss finish; the latter can be used on exterior work.

Full details, including colour range and a free working sample, can be obtained from the manufacturers, Hangers Paints.

New Repair and Service Depot

The opening of a repair and service depot at 7 Norfolk Court, Norfolk Street, Glasgow, has been announced by the Cambridge Instrument Company.

The Bacon and Egg

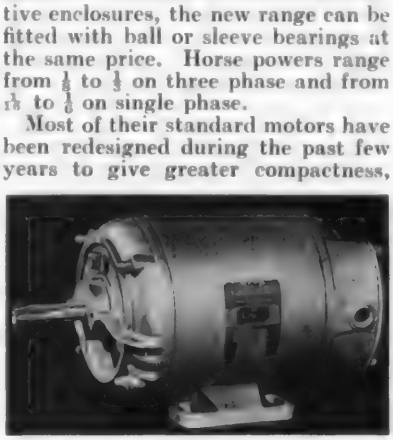
Open from 7.30 a.m. to midnight, the newly opened Bacon and Egg Restaurant, at Lyons' Coventry Street Corner House, enables customers seated at their tables to watch their meals being cooked through its kitchen's large plate glass windows, which face on to the restaurant. A special feature is that every dish is brought to the table and served in the same stainless steel skillet in which it is cooked.

Among the specialities on the menu are bacon and egg, omelette and bacon, fried egg, bacon, chipolata, grilled tomato, and French fried potatoes, and grilled gammon, fried egg, and French fried potatoes.

Motor and Control Gear

A range of smaller fractional h.p. motors to meet demands from makers of light industrial machines, for which their normal Gryphon fractional motors are too large, has recently been introduced by Brook Motors. Available in several alternative enclosures, the new range can be fitted with ball or sleeve bearings at the same price. Horse powers range from $\frac{1}{8}$ to $\frac{1}{3}$ on three phase and from $\frac{1}{12}$ to $\frac{1}{6}$ on single phase.

Most of their standard motors have been redesigned during the past few years to give greater compactness, strength, and improved electrical performance. The company have introduced a drip-proof range of motors to British Standard Draft Specification CR (ELE) 4464 and there is also a range of totally enclosed fan cooled types to the same specification just coming into production.



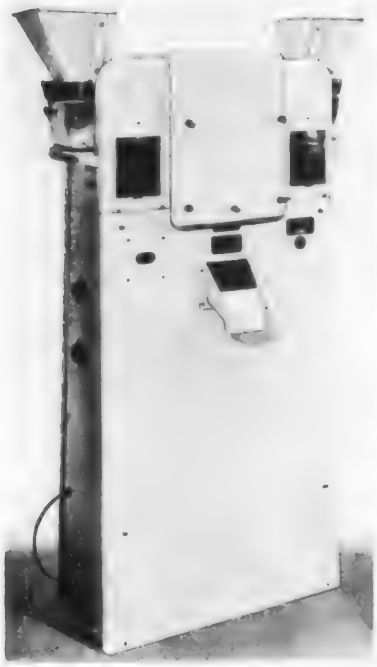
The Brook small size fractional h.p. motor.

Several new types of automatic starters have been added to the comprehensive range and special panels are being produced for several firms in the food and packaging industries, notably a control panel for a labelling machine, involving several motors. Control is centralised at a convenient point for the machine operator, while the multiple starter installation is neatly fitted into the door of the machine, giving complete protection but easy access for maintenance purposes.

U.S. Machinery to be made in Britain

A licence agreement has been made between the F. X. Hooper Company Inc. of Glenarm, Md., U.S.A. and Henry Simon Ltd. of Stockport for the manufacture and sale of Hooper corrugated container machinery throughout the world. The equipment will bear the name Simon-Hooper and production will begin as soon as the necessary arrangements are completed. In the meantime, enquiries for Hooper equipment will be dealt with either by Henry Simon Ltd. or by Soag Machinery Company, who have represented Hooper in this country for many years.

A licence agreement has also been made between Henry Simon Ltd. and the J. H. Mayhew Company of Excelsior, Minnesota, U.S.A. for the manufacture and sale of the Porter partition assembler on a similar basis. The first British-built machines will be available during 1954.



The Autopack double beam vibrator feed machine for weighing lumpy materials.

Vibratory Feed Weighing

A development of their vibratory feed weighing machine for weighing lumpy and irregularly shaped materials is announced by Autopack. It incorporates two weigh beams and pans instead of one, which doubles the output speed to between 30 and 40 weighings per minute. It will handle flaked wheats, oats, rice, corn flakes, and breakfast cereals as well as the usual range of dry cereals such as butter beans, peas, rice, tapioca, and lentils. Materials such as suet, dried fruits, nuts (shelled and unshelled), wrapped and bunch wrapped sweets, and small biscuits up to a diameter of 1½ in., can also be accommodated in this machine.

It will handle powders with equal efficiency and is particularly suitable for such materials as soap powders and coconut, which have hitherto been difficult to handle at high speeds.

For larger weights, say, from 3 lb. to 7 lb., variations of this machine, by which both vibrators fill one weigh pan, are available.

Manchester's New Refinery

The new refinery on the Trafford Park Estate, Manchester, has recently been brought into use by the Brown and Polson group of companies, and will gradually come into full production over the next 12 months. Its total capacity will give a production increase of about 80 per cent. over the old plant.

Three types of glucose are produced—liquid, solid, and powdered—of which the latter is the most familiar.

Roughly 80 per cent. of the liquid glucose produced goes to the confectionery manufacturer, the remainder being used by the soft drinks, biscuit, jam, and other industries.

Because of its use for the culture of antibiotics, solid glucose has become more important during recent years, 60 per cent. of production being used for this purpose. Other users of solid glucose include the brewing, animal feedstuffs, and tanning industries.

The production of powdered glucose is mainly for pharmaceutical purposes, about 90 per cent. going to this industry.

Induction Heating System

The Wild-Barfield induction heating system has for some time been applied with great success to the heating of metals for forging, billet heating, and heat treatment.

Results of research and development obtained during the past few years have made it possible to apply the system efficiently to heating kettles, autoclaves, stills, and other process vessels commonly used in the chemical and allied industries. Kestner Evaporator and Engineering Co. have acquired the exclusive rights of this system for such applications in the chemical and allied industries.

This patented method of heating employs standard mains frequencies and eliminates the need for complicated frequency changers which have hitherto been associated with induction heating systems. The simplicity of operation and the close control of temperature attainable are among the features which put this method of heating ahead for many of the processes carried out in the fields concerned.

The Wild-Barfield research facilities and wide knowledge on the electrical side combined with the chemical engineering experience and pilot plant laboratories of the Kestner Evaporator and Engineering Co. will assure the best possible advice on the application of this new method of heating. The latter company will shortly have available an installation in their laboratories for tests and demonstrations.

Service after Sales in U.S.A.

With headquarters in Chicago, the Brook Motor Corporation, the subsidiary company of Brook Motors, is well placed to cover the industrial belt of America. Service and distribution centres are established in all the major cities and towns of the U.S.A. These include Boston, Philadelphia, Kansas City, Seattle, Salt Lake City, New York, Pittsburg, Houston, San Francisco, Grand Rapids, Cleveland, Cincinatti, Dallas, Los Angeles, Indianapolis, New Orleans, Jacksonville, Milwaukee, Denver, Nashville, Tampa, Birmingham, Miami, Charllottee N.C. They are also covering the territories of Cuba (Havana), Puerto Rico (San Juan), Mexico (Mexico City and Monterrey), and Venezuela (Maracaibo and Caracas).

All machine tool makers, plant manufacturers, and exporters have been circularised concerning this service, and emphasis has been laid on the fact that the motors made by Brook are interchangeable with American motors, and that service, spare parts, and replacements, together with technical advice, are readily available.

Nylon Bottle Holders

Nylon bottle holders have been introduced by Dawson Bros. for their bottle washing machines.

The company claims that these bottle holders (*a*) have a resiliency not possessed by metal bottle holders and entirely eliminate chipped necks and bottle bruising; (*b*) are silent in operation; (*c*) are the means of a great saving in weight reducing power load on the conveyor; (*d*) a smoother bottle discharge; (*e*) are indestructible and are not affected by detergents or high temperatures, and (*f*) reduce scale formation to a minimum.

The new nylon bottle holder.

Equipment for the Jam Factory

By the development of the Kellie-Hydroseal continuous jam sterilising and cooling system, it is now possible to boil, fill, vacuum seal, sterilise, wash, cool, label, and despatch within two to two and a half hours from the time the product enters the boiling pan.

The filled and vacuum capped jars are delivered to the feed end of the machine on a 4 in. wide stainless steel slat conveyor from which they are automatically transferred to a chain conveyor which carries the jars through the machine in 24-wide formation. After sterilising, washing, and cooling, they are delivered automatically to a similar 4 in. wide stainless steel slat conveyor at the delivery end where they are subjected to a jet of compressed air to remove the pool of water which usually collects in the hollows of the vacuumised caps.

As the vacuum sealed jars enter the machine, they receive the following consecutive operations:

1. Sterilised by steam at 180°F.
2. Vacuumised.
3. Spray cooled by recirculating water at 140°F. (first treatment).
4. Spray washed and cooled at 100°F. (second treatment).
5. Spray cooled at 60°F. (third treatment).
6. The final cooling operation is direct from the main or cold water supply tank.
7. Water removed from the vacuumised caps by compressed air.

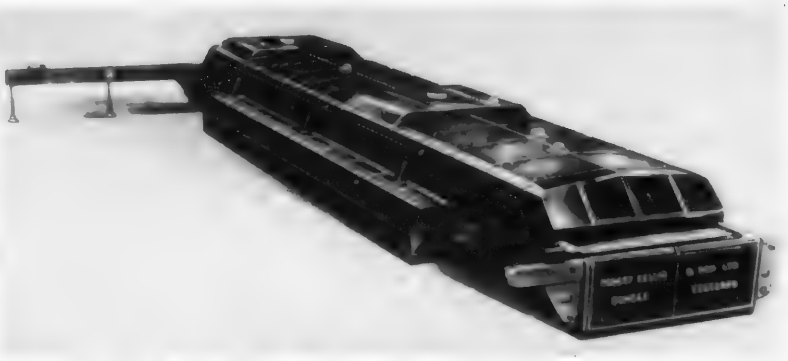
By this system it is estimated that at an entering temperature of 180°F.—the average filling temperature of the product—the processed jars will reach the delivery end of the machine at or about 90° to 100°F., at which temperature they may be discharged to a single line conveyor to the labelling machine.

Ventilation on Show

Nine of their Colt constant flow ventilators in the Davis house will be exhibited by Colt Ventilation at the Ideal Home Exhibition. Inside the ventilator is a set of accurately pivoted louvres which produce silent and efficient operation. As a gentle air stream touches them, they fall to (so regulating the speed of the air) and lift again as its force subsides. Even in a high wind the louvres are so regulated that they permit the entry of only a constant amount of fresh air so that no draught will be felt. This ventilator is self-adjusting and requires no power, maintenance, or lubrication.

Corrigendum

In the item "Antimony Poisoning" published in FOOD MANUFACTURE, 1954, **29**, 3, the opinions expressed were erroneously attributed to Dr. C. Metcalfe Brown, Medical Officer of Health, Manchester.



Continuous jam sterilising and cooling equipment.

Fork Lift Hire Fleet

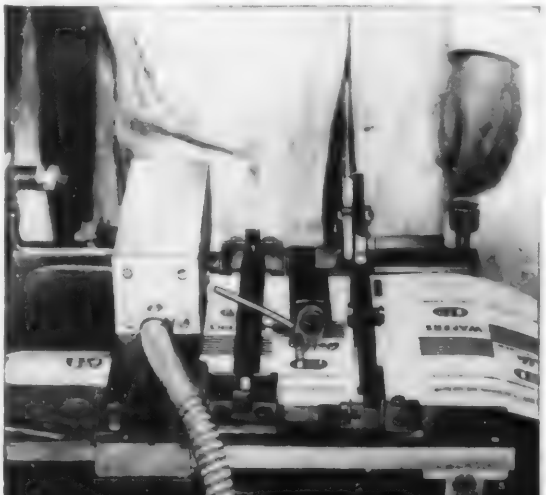
All firms faced with occasional handling problems will be interested in the fork lift hire fleet now being operated by George Cohen Sons and Co. They are offering the latest Diesel model I.T.D. Stracatruc, having a 2 ton, 12 foot lift.

Photoelectric Cell to Maintain Register

Photoelectric control equipment incorporated in automatic wafer packing machines ensures complete accuracy of register between the printed wrapping paper and the enclosed wafers. Machines of this type have been installed at Wall's Southall factory, and in an eight-hour shift it packs a quarter of a million wafers in waxed paper, 12 at a time. The wrapping paper carries a printed pattern and the photoelectric control equipment, supplied by The General Electric Co., was introduced because, without it, the register between the printed wrapping paper and the enclosed wafers would continually go astray.

The loose wafers are fed in at the back and the paper runs off rolls; the machine wraps the wafers into packs which are heat-sealed and then passed off the machine at the front. A mechanical arm draws the required length of wrapping paper off the rolls for each pack but, because of the difference in the tension required to pull the full roll as compared with pulling a half-unwound roll, it is impossible to have the arm drawing a consistent length of paper through all the time and a final adjustment is necessary for accurate register between the design printed on the wrapping paper and the 12 wafers which constitute each pack.

Accordingly, the arm is adjusted to pull each time a fraction more paper than is actually required and a photoelectric cell is incorporated to make sure of the final adjustment. A rectangular blue slot is printed on the side of the wrapping paper at regular intervals. This slot is located so that if the register is dead-on, it will interrupt the light beam from the projector and prevent it falling on the photoelectric cell. If the slot is drawn beyond the light beam, the light activates the cell and causes a metal roller, situated just behind the cell, to fall, thus dragging the paper back until the rectangular slot interrupts the light beam. When this happens the metal roller ceases to pull the paper back.



The G.E.C. photoelectric control equipment for automatic wafer packing machines.

The mechanical arm drawing the waxed paper into the machine is set to pull from $\frac{1}{8}$ to $\frac{3}{8}$ in. more paper than is required each time, the roller then pulling the paper back as required. In practice, the photoelectric cell causes the roller to operate for about one in three packs.

The rectangular slot is printed on the side of the wrapping paper so that the normal print on it will not interfere with the light beam. Being rectangular, the slot permits a certain amount of lateral play in the wrapping paper.

The drip-proof version of the new Sigmund PumPak range of electric integral pumps provides an example of the single shaft technique of centrifugal pump design.

A New Centrifugal Pump

On the occasion of the introduction of their latest addition to the extensive range of centrifugal pumps, Sigmund Pumps held a cocktail party at the Grosvenor Hotel, London. Introducing a new standard in the design and performance of close coupled electric pumping sets, the PumPak is an outstanding example of the single shaft technique of centrifugal pump design.

All the proved best features of integral construction are incorporated in this new unit with additional exclusive refinements developed by the company which make this pump unique in its type.

The two principal features are the Sigmund stator pack service, and the special ventilation arrangement. In the usual type of integral pump, the difficulty of replacing the stator in case of electrical breakdown is often the principal objection to the application of a close coupled unit. The Sigmund patented method of withdrawing the stator, and the special stator pack replacement service, completely obviate this objection. The stator housing is so designed that it can be removed complete with stator without disturbing the pump in any way, it being only necessary to disconnect the leads to the terminal box and remove four nuts to enable the whole unit to be completely withdrawn.

Stocks of each size of PumPak stators are held at the works so that in the event of an electrical failure developing in the set, a replacement stator can be despatched promptly thereby enabling the pump to resume duty with the minimum of delay, inconvenience, and expense.

The importance of adequate ventilation has been specially studied, and the cooling arrangement is another patented feature. Cool air is drawn through the entire motor, by a fan mounted on the pump side of the stator, a stream of which circulates around the pump side bearing, effectively cooling it, and preventing the entry of any liquid into the bearing housing.

The initial PumPak range now in full scale production covers units from 1½ to 15 h.p. at 1,450 and 2,900 r.p.m. with capacities up to 500 g.p.m. and heads up to 175 ft. giving a wide selection of units, but an additional series of fan cooled and small types will shortly be available enabling the potential user to meet any specific requirement from the most comprehensive group of integral pumps offered by any one manufacturer.

In addition to the standard cast iron, bronze fitted pumps, these units are supplied with cast iron casing, and bronze impeller, all iron construction, all bronze hydraulic parts, and in certain types, with stainless steel hydraulic parts.

It operates efficiently in any desired position, is simple to install, and gives an excellent all-round performance at low upkeep cost. Its extreme adaptability enables it to be advantageously applied to a diversity of service applications in many fields.

Single Bottle Width Slat Conveyors

The British Standards Institution has now issued B.S. 2075 : 1954 "Chains and wheels for single bottle width slat conveyors."

Although this document has been prepared under the authority of the Dairying Industry Standards Committee, the Food Machinery Association and the Mineral Water Engineers Association collaborated and it is therefore hoped that it will prove of advantage to all industries which use this type of conveyor for transporting bottles of about the same size as milk bottles.

Owing to the fact that the adoption of a standard form of integral-slat conveyor would necessitate some modification to all existing designs, the Committee decided to confine this British Standard to the roller chain and slat band chain types of conveyor.

The specification details the materials and dimensions of both the chains and the slats, together with tolerances.

New Variety of Baby Food

The latest addition to their Spoonfoods range of strained and homogenised baby foods is now being distributed by Trufood. The new food, Thick Bone Broth with Beef and Vegetables, was developed because of the existence of a popular demand by mothers for a thickened broth which will add additional bulk to the baby's diet from five to six months onwards and still be easily digestible.

Made from bone broth, stewed beef, potatoes, carrots, peas, onions, tomato purée, and hydrolysed protein, the new food is packed in a glass jar, and is the eleventh Spoonfoods variety to be developed by the company.

Machinery and Accessories

The production of all classes of jigs, fixtures, gauges, and cutting tools and of various classes of machine tool and other items is undertaken by Gearaide, who also carry out the machining of machine parts, including beds, bases, columns, gear boxes, head stocks, and lathe and machine beds.

The necessary patterns and castings in all metals for parts and complete machines are dealt with by the company, who are also prepared to carry out the manufacture of experimental machines or accessories and to develop them on the lines required. Complete machines can be made in all stages, whether it be for high class machines or for production machines or parts which have to be produced for use where price is an essential feature coupled with an accurate and well-finished job.

The company's production covers all classes of machines or parts and they can supply such items as gears, rollers, sheet metal covers, fabricated structures, and precision tooling and component manufacture on capstans, turret lathes, horizontal and vertical borers, and grinding and milling machinery.

Fluorescent Tube Range Increased

As from March 1, 1954, Crompton Parkinson will be marketing two new ranges of Crompton fluorescent tubes: the Crompton new warm white and the Crompton Deluxe warm white.

The introduction of the new warm white tube marks a further step in technical progress. This new tube will throughout its long life provide over 10 per cent. more light than was previously attainable.

The Deluxe warm white has been specially developed to provide attractive colour renderings, particularly of foodstuffs, clothing materials, and complexions. It will provide illumination to enhance the appearance and atmosphere of restaurants, hotels, fashion salons, and all places for social occasions.

A new type of oil hydraulic compression ram unit for bottle packaging.

Hydraulic Press for Bottle Packing

To meet the problem of breakages arising from uneven levels under the nailing machines, a valuable new unit has been introduced into two Scottish bottling plants. The normal practice in such plants is to pack the bottles in either straw or *papier maché* containers and then to pack into timber outers. When six dozen bottles of beer are assembled roughly into the outer, the contents protrude perhaps three to four inches above the timber level. Unless these bottles are compressed manually, when the box comes forward to be nailed it fouls the machine resulting in the breakage of boxes, faulty nailing, and bottle breakages.

To overcome the problem, Joseph Potts Ltd. have devised an oil hydraulic press which stands over the conveyor line and compresses the contents of each box preparatory to its passing under the nailing machine. Such machines have now been successfully used in the bottling hall of a large Scottish brewery and also in a Leith whisky export bottling plant.

It has been found that the new compression unit gives a more compact fit which has allowed the use of a smaller timber outer leading to savings in the cost of timber boxes and in freight charges of one shilling per case; as hundreds of thousands of cases are shipped annually, the extent of the saving is obvious. In addition to this, the company report faster handling, freedom from breakage, and a much more satisfactory pack.

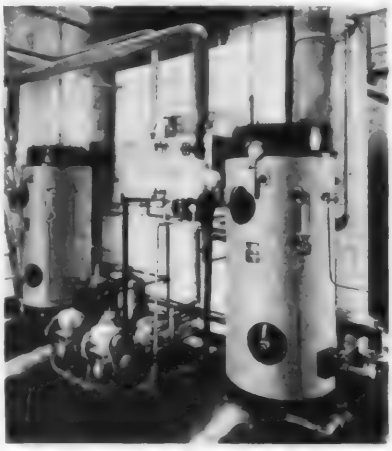
The press is mounted on a steel frame which straddles the conveyor line, the ram being mounted in the top centre and having a rigid timber block bolted to the working head.

The experience gained in the use of the machine in the manufacture of beer and whisky makes it clear that the press has a very wide field of application in other spheres where bottles are packed into outer timber containers for transportation.

Gas-fired Steam Boilers

A range of gas-fired steam boilers, particularly suitable for providing steam up to 100 lb. per sq. in. pressure with outputs from 30 to 400 lb. steam per hour, is manufactured by J. Brockhouse and Co. Designed to meet British Standard Specifications, they are fully automatic in operation and embody full safety devices.

Many have been installed over the past 20 years for use with kitchen equipment, bottle and dish washing machines, dairy and ice cream sterilisation plant, and for the boiling of jams, sauces, and pickles. Another application has been to supply proving steam for bakers' ovens.



An installation of Brockhouse gas-fired steam boilers.

In addition to process steam supply, the same boiler can provide additional duty for space heating or hot water supply through a calorifier.

This range of boilers is noted for its quick steaming; full working pressure is attained within 30 to 40 minutes of lighting-up.

Complete Cake Mixes

A complete cake mix with sufficient flexibility to ensure the production of good cakes at every baking has been devised by I. H. Lavery and Co. Known as Harlequin, the cake mix requires the addition of water only to the amount of 4 oz. To ensure that the correct amount of water is added, the company have made it possible to use the packet as a water measure. When the bottom portion of the pack is cut on the dotted line, this will hold exactly 4 oz. of water without any leakage.

Paper Sacks for Flour

Cake flour in bulk is now being packed by Spillers for bakers and confectioners in 70 lb. weights in multi-wall paper sacks, instead of the 140 lb. jute bags previously used.

From the hygienic point of view, the non-returnable Medway paper sacks which have been adopted are ideal. Their construction prevents any possibility of contamination reaching the contents; when the sack is emptied there is no risk of contamination by sack fibre.

This new use for the Medway paper sack is another example of the pioneering work of the Reed Paper Group in the development of modern packaging.

Effluent Screening

For more than 40 years the makers of the range of Parkwood screens have been supplying equipment to recover the solids carried out of factories by waste waters.

These screens have found a wide application in the canning, preserve, pickle, and brewing trades. All these industries have a large intake of water for process and for cleaning, a great part of which is not recirculated. The outflowing waters are nowadays subject to inspection by local authorities or river boards who have to accept, and in many cases, to treat them.

The biological action, upon which this treatment is based, can be considerably helped by the extraction of the heavier suspended solids at the outflow and, by passing through a screen, the waters are ready for further treatment.

The screens are self-clearing, in that the sieving area, on which the solids are retained, is swept by brushes at regular intervals, obviating any danger of blockage.

Although standardised as far as possible, the screens, made by the Longwood Engineering Co., are capable of adaptation to any variation of site.

The packs devised by Brown Bibby and Gregory for the new Symington soups are constructed of Tripolam.

BOOKLETS RECEIVED

Leaflets describing two new service cabinet models have been published by Prestcold.

▪

A selection of interesting articles about Fenner V-Belts new developments in Taper-Lock, and the company's products in action is contained in the latest issue of Fenner's *V-Belt Journal*.

▪

The 1954 edition of the Year Book of the Dutch Cocoa, Chocolate, and Confectionery Industry is now available free of charge to all official bodies. It contains a list of Dutch confectionery and chocolate manufacturers.

▪

The first issue of a bulletin dealing with the application of laboratory chemicals, procedures evolved in the company's laboratories, and new apparatus of interest to those engaged in normal laboratory work has been published by May and Baker.

▪

General and technical information on edible bone phosphate supplied by Calfos for the purposes of calcium fortification and as a "free-flow" and buffering agent to many branches of the food manufacturing industry is contained in two booklets recently issued by the company.

▪

A complete edition of the catalogue listing their range of products has been issued by Quickfit and Quartz. This catalogue contains a section dealing with specialised apparatus covering, among other processes, extraction, moisture determination, water distillation, fractionation, semi-micro distillation, filtration, and chromatography.

▪

The 1954 edition of the guide to hotels in the British Isles published annually by the British Travel and Holidays Association (price 2s. 6d.) is now available. The new edition contains details of more than 4,000 hotels, 16 scale road maps, and a section devoted to London restaurants which has been greatly expanded to include such information as hours of opening, closing days, and remarks on cuisine.

▪

In just over 50 years, William Batchelor's little side-line—dried peas in "tuppeny" packets—has formed the basis for one of the largest food manufacturing concerns in Great Britain. In an attractive brochure, entitled "Full Harvest," which has recently been published by the company is described the story of its growth, the harvesting of peas for canning and processing out of season, the canning of fruit, baked beans, and meat products, and the introduction in 1951 of Chicken Noodle Soup, packed in a foil envelope.

OBITER DICTA

● Sausage can be the cornerstone of a successful business.—"*Meat Trades Journal.*"

● I beg you, never, never, never, boil your coffee.—*R. S. Dye, Chaplain, Malta, in a letter to the "Church Times."*

● If a rag and bone man offered me a drink, I daresay I should not accept it, but I don't see why it should be a crime. — *Lord Chief Justice Goddard.*

● I have such a fear for the poor English people who must eat food which is without love cooked.—*Dr. Hermann Scherchen, the Viennese orchestral conductor.*

● In spite of all the technicalities, is it still all right to drink Cola? Is there anything particularly dangerous about *p*H?—*Mr. McAddam, M.P., speaking in the House of Commons.*

● Nearly all animals like ice cream; given the chance, a bear would eat a gallon a day. Elephants prefer brickettes—unwrapped. — "*Aristarch,*" *writing in "Ice Cream and Frozen Confectionery."*

● In an hotel in the Burgundy area wash basins in the bedrooms are being supplied with three taps instead of two, labelled "froide," "chaude," and "vin."—"*Confectionery Journal.*"

● I am inclined to the belief that plagues such as myxomatosis are due to factors not yet envisaged and which may be transmitted through solar vibration or some atmospheric condition.—*Editor of "Health for All."*

● We look forward to many pleasant hours discussing various varieties and years of the *Solanum Tuberosum*, sneering at that vulgar imitation of the potato, the Jerusalem artichoke, and finishing the evening with a rousing chorus of "Haulm, sweet Haulm."—*The "Western Mail."*

● Some enjoy the convivial dinner; I do not. At the end of a day devoted to an intellectual feast which might be compared to successive courses of suet dumpling laced with vinegar, I am too whacked to maintain conversation at an enjoyable level.—*Extract from an article in "The Lancet."*

The 1954 edition of the Mazda lamp catalogue is now available. Over 1,500 of the more important lamps in the standard Mazda range are listed in groups and indexed, full details of each lamp being clearly tabulated. Also included are sections dealing briefly with Mazda lighting equipment and fittings, purchase tax, BTH branch offices, a ready reckoner, and details of other publications.

ERECTIONS AND EXTENSIONS

Plans to carry out extensions to their premises in Springfield Road, Hayes, Middlesex, at a cost of £80,000, are being proceeded with by Chibnalls Bakeries.

▪

A licence has been granted to the Jarrow and Hebburn Co-operative Society for the construction of a bakery in Leam Lane, Jarrow.

▪

Plans to rebuild their pickle factory at Askew Road, Gateshead-on-Tyne, are being proceeded with by Hoggetts, Ltd.

COMPANY NEWS

In his statement circulated with the report and accounts and presented at the annual general meeting, Mr. Harold M. Beak, chairman and joint managing director of Foster Clark, said that the trading profit of the group amounting to £75,205 had, as compared with the previous year, been adversely affected by reason of the need to write down the value of stocks of packaging and other materials which were now worth less than their cost price. Had this contingency not arisen the trading profit of the group would have been little less than that of the previous year.

After adding the investment income, and having provided for all taxation due upon these earnings, the net profit available was £27,802, from which must be deducted the Preference dividend for the year, and the interim dividend paid upon the Ordinary stock in July last, leaving a balance of £14,543.

Although this amount was insufficient to cover a final dividend upon the Ordinary stock at the same rate as last year, the directors felt that the adverse factors which had brought about the reduced profit might largely be regarded as non-recurring items, and the prospects for the current year as far as could be judged at present justified the recommendation of a maintenance of the rate of final dividend. It had therefore been decided to transfer £10,000 from general revenue reserve and £5,000 from dividend equalisation reserve, so that the balance standing to the credit of profit and loss appropriation account would remain almost unchanged at £79,484.

World Food News

Norwegians Drink Most Milk

The Norwegians now drink more milk than any other nation in the world, says Trygve Benterud, director of the Norwegian Milk Producers' National Association, daily consumption being about two pints per person. It is also stated that in 1953 Norway exported 5,134 tons of butter and 1,700 tons of cheese.

Irish Food Exports in 1953

One of the main features of the Irish Republic's trade during the first 11 months of 1953 was a big increase in the export of pig meat (including tinned ham) and milk products (including chocolate crumb and unsweetened milk). Chocolate and confectionery exports also increased, but there was a drop in processed beef and sweetened fat exports compared with the same period in 1952.

Imports for November were valued at £16,222,923 compared with £13,989,201 in November, 1952, while exports at £9,108,920 compared with £9,728,603. The rise in the value of imports took place almost entirely in respect of raw materials and manufactured goods.

The official trade returns show the following processed beef exports for the 11 month period:

	cwt.	£
Fresh or chilled beef	373,852	3,982,904
Frozen beef ..	73,892	961,824
Tinned beef ..	186,295	2,488,809
Total value		£7,433,537

The figures for the first 11 months in 1952 were as follows:

	cwt.	£
Fresh or chilled beef	206,602	2,028,264
Frozen beef ..	214,315	3,087,157
Tinned beef ..	317,772	4,130,412
Total value		£9,245,833

This shows a drop in the value of beef exports of £1,812,296, and a sharp fall in quantities.

Pig meat exports for 1953, to a total value of £6,692,131, were:

Pork 306,156 cwt. ..	£4,335,878
Bacon and hams 91,784	£1,497,717
Tinned hams 30,442 ..	£858,536

The figures for the same period in 1952 were: pork, 96,121 (cwt.), £1,364,358; bacon and hams, 5,462, £96,149; tinned hams, 16,068, £611,328. Total value, £2,071,835.

Practically all the exports went to Britain except frozen beef, of which the United States was the largest buyer.

Milk products yielded £9,293,293 during the first 11 months last year, the highest figure for several years, compared with £6,498,666 for the same period in 1952. The value of chocolate crumb exports alone up to November last year was £7,474,250 against £4,468,047 in the 1952 period.

There was, however, a sharp fall in the volume and value of unsweetened milk since 1952, but cream as a new element came into the picture last year, bringing the Irish Republic £795,439.

Chocolate and confectionery exports were valued at £10,204,766 for the 11 months, against £1,951,261 in the 1952 period. This was considered a remarkable rise in value and volume. Sweetened fat yielded £829,354. In the same period of 1952, the total sweetened fat exports were valued at £4,512,655.

Coating for Shelled Almonds

As part of research on pectinate and pectate coatings for foods such as dried or candied fruit, soft dates, and shelled almonds, scientists at the Western Regional Research Laboratory (Albany, Calif.) have developed techniques for enrobing these foods with pectic films. The main industrial interest is to cut handling and packaging costs as well as to turn out a product more pleasing to the consumer.

With almonds, glycerine must be used as a plasticiser for the film, about 50 per cent. of the weight of the pectic substance being the optimum amount. Primary purposes are: to hold the salt uniformly on the kernels, and to impart a non-oily surface. Dyes are also added to improve the appearance of the nuts, especially of broken kernels.

Material Handling in Canada

A contract has been signed by Fisher and Ludlow with Sir Robert McAlpine and Sons for the erection of a factory at Ajax, Ontario, to cater for the growing demands of their Material Handling Division, which is now firmly established in Canada. Its Flowlink chain conveyors, Flowline belt conveyors, Flowstack pallets, and Fisholow material handling equipment have received wide acceptance from Canadian industry.

The new building is of modern design, the structure being entirely of steel and the framework being completely independent of the outer walls, which are of masonry and glass, with reinforced concrete foundations.

The floor is 6 in. thick, reinforced concrete; the ceiling deck tongued and grooved spruce, insulated, with a 20 year bond and felt gravel roof over it.

The building has a 14 ft. clear ceiling height, the stanchions are 30 ft. centres, the whole being designed for maximum material handling efficiency. The shipping doors provide efficient access for truck-level loading, rail loading, and fork truck loading.

Apart from its primary function of providing the most efficient manufacturing and storage space, this plant will be used as a demonstration centre for the company's material handling and storage equipment.

OVERSEAS ENQUIRIES

Air Conditioning and Fork Lift Trucks

Legere Engineering Supplies Ltd., 10, Bayswater Avenue, Ottawa, Ontario, have expressed interest in representing United Kingdom manufacturers of air conditioning units and petrol and electrically operated fork lift trucks in the Ottawa area. They prefer to buy on their own account.

At present the company do not undertake any mechanical servicing, but if they acquire the good line in air conditioning units for which they are looking, they will establish the necessary servicing organisation to maintain such equipment.

Firms interested in this enquiry are invited to write by air mail direct to the company, giving full details about their products, prices in Canadian dollars c.i.f. Canadian port, delivery that can be offered, etc.

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Liquorice Novelties

The Edward M. Cerf Co., 740-750, Post Street, San Francisco, California, wish to be put in touch with United Kingdom manufacturers who can supply them with good quality liquorice allsorts, pontefract cakes, liquorice novelties, or penny goods.

United Kingdom firms interested in this enquiry should write direct by air mail to The Edward M. Cerf Co. at the address given, submitting full particulars of their products, together with all available trade literature and quoting prices in dollars c.i.f. U.S. port.

Food and Medical Research

Closer relationship with medical research through cultivation of closer liaison between food and nutrition research workers and interested members of the medical profession was advocated by the Food and Nutrition Research Advisory Committee at its annual meeting in Washington.

The committee, established under authority of the Research and Marketing Act of 1946, was concerned this year chiefly with a review of the USDA's research on the influence of processing on the nutritive quality of food and preservation of its quality. Members also reviewed the department's production research as it relates to food nutrients.

The first presentation of the Judson F. Swearingen Award is made by Dr. C. A. Culver (*right*), **chairman of the judging panel, to Mr. W. L. Rollwitz** (*left*) **and Mr. John P. O'Meara.**

Award for Research Work

The first annual Judson F. Swearingen Award for outstanding scientific research work at Southwest Research Institute has been won by John P. O'Meara and William L. Rollwitz. Both members of the Institute's Physics Department staff, they were cited for their " pioneer work in nuclear resonance at low magnetic field strengths." Their work concerned the application of low field strength nuclear resonance techniques to the determination of the water content of food substances.

Cattle Breeding Experiment

The Commonwealth Scientific and Industrial Research Organisation has begun experiments aimed at breeding a more suitable type of cattle for Northern Australia.

Dr. I. Clunies Ross, chairman of CSIRO, said that the organisation had established an experimental cattle breeding station north of Rockhampton, Queensland. Experiments would be carried out to establish the adaptability of British and exotic breeds of cattle under conditions in Northern Australia. Northern and southern Hereford and Zebu and Afrikander cattle would be tested as pure breeds and crosses. Attempts would be made to define the characters of various cattle to determine their suitability for Northern Australia both in humid coastal areas and in the dry inland. Later on, it was hoped to include the tropical milking breed, Red Sindhi, in the trials.

The Australian Meat Board has provided finance for the experimental station.

Norway's Agreement with Russia

The new trade agreement between Norway and the Soviet Union envisages an exchange of goods to a value of altogether about £10,000,000 in 1954. This is about the same value as last year's Norwegian-Russian trade exchange. Norway will supply chiefly herrings and fats, and receive from Russia mostly grain, ores, and phosphate. A number of Russian cars will also be imported.

New Italian Food Machinery

Among the machinery of interest to the food and ancillary industries exhibited at the 31st International Fair of Milan was a pneumatic machine, manufactured by the Eolus Company, which extracts the powders remaining in bags and collects them for recovery ; this easily transportable machine is operated by a pedal.

Many innovations were apparent in the alimentary paste industry, the most important one being the vacuum kneader. A special device is set at the mouth of the pressure chamber to suck the air particles contained in the dough which may cause acidity during the drying process.

Schiavon of Porcellengo presented some improved driers with continuous circulation of conditioned air, a tunnel drier especially developed for long goods, and a device for ventilation.

An improved type of rotary machine with interchangeable shaping rollers capable of making a ravioli of three different sizes was shown by Varvello of Stresa.

Another excellent machine for this production, developed by De Lellis, enables the user to vary the quantity of the ravioli stuffing.

Of interest to bread and cake makers was the cyclothermal oven for baking bread and pastry, made by the Antonello Company of Monza.

Both the Imfa Company and the Tibiletti Company exhibited some interesting electric devices for the opening and closing of oven doors.

Artofex presented a kneading machine, an oven with a main chamber for bread, and a lower one for pastry, and several mixers, beaters, and similar machinery.

Pasteurisers for the ice cream industry were featured by the Carpigiani Company of Bologna and Tortorelli of Siena. Also shown by the former company was a pneumatic machine that opens, by means of a puff of air, the small paper bags used by the ice cream industry.

Robot Answers Telephone

A Norwegian firm, Östfold Radio A/S, is soon to start commercial production of an instrument which answers the telephone and gives messages while the subscriber is out. The instrument can be attached to any type of telephone and answers automatically each time the telephone rings. The subscriber can dictate any message up to 30 seconds before going out, and the message is automatically erased when a new message is dictated. If the instrument is attached to a dictaphone, incoming messages can also be accepted. The instrument has been designed by engineer Helge Halvorsen on the basis of an idea proposed by a factory owner at Fredrikstad, Norway, in 1945. Patents have been taken out in a number of countries.

Australian Peanut Industry Grows

The peanut growing industry, formerly confined principally to Queensland, has, during the past five years, attracted much attention from farmers in the Northern Rivers districts of New South Wales.

In the 1947-48 season only 150 acres were planted, and so little was known about the new crop that its cultivation was almost abandoned. So inefficient were the harvesting methods that most of the crops were ruined by being improperly dried.

Expert advice was sought and the 1952-53 crop went to the forefront of the Australian peanut market; 2s. 8d. per lb. was paid for choice lots and a general average of 1s. 9d. was received throughout the district.

In the year, 500 growers planted more than 700 acres; these yielded 1,000 tons of peanuts, worth more than £A125,000. Growers concentrate on the roasting peanut for which there is always a good demand, but its value as stock food and the plant as green manure is not being overlooked.

News from the Ministries

Appointments and Retirements

Major-General Sir Harold Wernher, Bart., G.C.V.O., T.D., has been appointed chairman of the Governing Body of the National Institute of Agricultural Engineering in succession to the Rt. Hon. the Earl of Radnor, K.C.V.O., who has resigned owing to the pressure of other business.

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The resignations of Mr. H. R. Humphries, C.B.E., Director of Animal Feedingstuffs, and Mr. G. H. Stanwix, M.B.E., acting Director of Rice, are announced by the Minister of Food.

At the request of the Minister, Mr. Humphries has agreed to remain available for consultation until July 31, 1954. Mr. Stanwix has made arrangements for the appointment of a Rice Advisory Committee which will be available for consultation by the Ministry. The Central Division of the Cereals Group, Ministry of Food, Great Westminster House, Horseferry Road, London, S.W.1, will be responsible for dealing with any enquiries from the trade about animal feedingstuffs or rice.

Bacterial Blight of Peas

The Ministry of Agriculture and Fisheries has discussed with representatives of the National Farmers' Union, the Home-grown Threshed Peas Joint Committee, and the Seed Trade Association the possible danger of *Pseudomonas pisi* being introduced into Britain by seed imports from abroad.

It is understood that the majority of this country's seed pea imports are from countries where the disease is not established, and in such cases there is no risk of the imported seed being infected. There is no authentic record of the disease in the United Kingdom. On balance, therefore, there seems to be no imminent danger of the disease becoming established.

The Ministry is at present engaged in the revision of its Importation of Plants Orders and in doing so will consider the necessity of taking steps to ensure that only disease-free seed is imported into the U.K.

Thiourea and Citrus Fruits

Attention has been drawn to the possible use, by certain orange growers, of thiourea and of fungicides containing thiourea, as a rot and mould suppressant.

Thiourea can penetrate the skin of citrus fruits and find its way into the juice. Experiments in the United States have shown that this chemical is lethal to some animals in very low concentrations. Its use is accordingly open to strong objections on grounds of toxicity.

The Minister of Food is advised that thiourea falls within the definition of "Preservative" contained in the Preservatives in Food Regulations, and that the sale of any article of food containing thiourea would be a contravention of these Regulations, since no provision exists therein permitting its addition to food. For this reason, it would not be appropriate to introduce legislation designed specifically to prohibit the importation and sale of citrus fruit so treated.

There is no conclusive evidence that citrus fruit treated with thiourea is being imported into the U.K., but the possibility cannot be excluded and the Minister is confident that appropriate action will be taken in the event of infringement of the Regulations being revealed by analysis of samples of citrus fruit.

Appointment of Consumers' Committees

The following two further members of the Consumers' Committee for England and Wales have been appointed under the Agricultural Marketing Act, 1931: Prof. R. C. Tress, B.Sc.(Econ.), and Mrs. E. H. Gasking, O.B.E.

The Minister of Agriculture and Fisheries and the Secretary of State for Scotland, acting jointly, have appointed the same two persons as further members of the Consumers' Committee for Great Britain.

The reconstitution of these Committees was announced on December 18, 1953.

Dutch Bacon Agreement

An agreement has been concluded between the United Kingdom and Netherlands Governments for a new bacon contract covering the period December 1, 1953, until September 29, 1956.

Under the new contract, the United Kingdom will purchase 35,000 tons between December 1, 1953, and December 31, 1954; 28,000 tons in 1955, and 21,000 tons between January 1 and September 29, 1956.

The price until the end of 1954 is 237s. 6d. per cwt. c. and f. U.K. port. The prices for the subsequent periods will be agreed later, and each will be within the limits of a 10 per cent. increase or decrease on the price for the preceding periods.

The new price of 237s. 6d. per cwt. c. and f. U.K. port is the same as that for Danish bacon.

The new contract will retain the provision in the previous contract that in the event of a decision to end Ministry purchases of bacon, imports from the Netherlands can be handed back to the private trade, subject to the terms of the contract being fulfilled.

Chemical Agents for Dairy Equipment

Approval has recently been given by the Minister of Food and the Minister of Agriculture and Fisheries under the Milk and Dairies Regulations, 1949 and 1953 for the use of Domestos (Agricultural Grade), a sodium hypochlorite solution, as an oxidising or preservative agent in the cleansing of dairy utensils.

Canned Salmon

Negotiations are to be opened for one more purchase from North America on Government account before decontrolling canned salmon and handing the trade back to private importers later in the year. This final purchase on Government account will ensure that the market is not denuded of supplies immediately prior to decontrol. The date of decontrol and the arrangements for imports by private traders will be announced in due course after the usual consultations with the trade.

Code for Cream Soup Modified

It has now been decided that a product described as cream soup should contain not less than 2½ per cent. by weight of butterfat; but no exception will be taken to a product sold under this description: (*a*) which contains less than 2½ per cent. but not less than 1½ per cent. by weight of butterfat if the total fat content is not less than 3 per cent., or (*b*) which contains no butterfat or less than 1½ per cent. by weight of butterfat if the total fat content is not less than 3½ per cent.

Relaxations in Licensing Arrangements

Relaxations in import licensing arrangements for various foods have been announced as follows:

Meat and Meat Products.—From January 13, some additional kinds of canned and uncanned meat and meat products can be imported without separate import licence from Western Europe and certain other countries (excluding the dollar area and Eastern Europe).

Illipe Butter and Nuts.—From January 13, these goods can be imported without separate import licence from Western Europe and certain other countries (excluding the dollar area and Eastern Europe).

Imports of Processed Cheese.—Following the announcement by the Ministry of Food on December 28, 1953, that restrictions on the size of the pack of imported processed cheese would no longer apply, the Board of Trade have made a corresponding amendment to the Open General Licence.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Piping Jelly

B.6877. *We should be obliged if you could supply us with a formula for piping jelly.* (Ireland)

The following formula may be used as a basis for trial:

Sugar	10 lb.
Corn syrup	7½ ,,
Water	1¼ gal.
Agar-agar	6 oz.
Citric acid	½ ,,
Fruit essence	¼ fl. oz.

The agar-agar is soaked in 1¼ gal. of water until fully absorbed, then finally dissolved by application of a little heat. The sugar and corn syrup are added and cooked carefully to 214°F. The batch is withdrawn from heat, and citric acid dissolved to a solution in water; essence and colour are then added. The surface of the batch is skimmed free from impurities and poured into glass containers.

"Sweating" of Jelly Cubes

B.6881. *We are manufacturing sugar coated jelly cubes, and after the cubes have been coated with castor sugar, they are packed into moisture-proof film bags; after a short period of time we find that the coating of sugar is inclined to melt. Is there any way of overcoming this defect, allowing for normal storage at the factory or in the retail shop? We feel that the coating of the water cooled setting slabs with slab oil to prevent adhesion may be the cause of the trouble.* (N. Ireland)

The slab oil is not the prime reason for the castor sugar melting on the jellies. All manufacturers use this method of preventing sticking to the slabs. The reason is in the product itself—there is too much free moisture in the jelly.

If the gelatin content has been reduced too much, there is insufficient colloid to carry the moisture. This is the usual cause of the trouble. Another cause of sweating is insufficient drying time before packing in moisture-proof film bags. In these bags, no moisture from the jellies can escape, thereby causing a high relative humidity inside the bag and resulting in solution of the fine layer of sugar.

Experiments using increased gelatin content and extending drying time before packing should be made, the results of which should overcome the trouble.

Cocktail and Pickled Onions

B.6878. *Could you please give us details of the method of preparing pickled onions and cocktail onions?* (London)

For pickled onions, the amount of vinegar per jar is roughly equivalent in weight to that of the vegetable. Thus, in order to achieve an overall acidity of 3·6 per cent., it is necessary either to reinforce the vinegar with acetic acid to bring this to 7·2 per cent. or to acidify the debrined vegetables by immersion in an acetic solution prior to bottling with vinegar of normal strength, *i.e.* 4·5 per cent. to 5·3 per cent.

Assuming the vinegar to be 5·0 per cent., it would be necessary for the vegetables themselves to have an acid content of 2.2 per cent. so that after equilibrium has been reached (three or four days after bottling) the overall acidity would be 3·6 per cent. as acetic—assuming that there are equal quantities by weight of vegetables and vinegar.

The most convenient method is the first, but it is important that the vegetables be drained thoroughly before they are filled into jars.

In all essentials, the pickling of onions is similar to the procedure adopted for other pickled products. Very small onions are often put up in long cylindrical bottles, as cocktail onions, and where these are closed with corks, it is necessary either to coat these thoroughly with paraffin or to insulate them from contact with the vinegar by use of a ceresin or other impervious disc.

Cocktail onions are usually sweetened with saccharin or sugar which is added to the vinegar before bottling. A small amount of colour can be added to the sweetened spirit vinegar. Tartrazine is used for the yellow onions and a variety of reds and orange reds can also be used. The colour solution should be filtered before adding to the vinegar.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6844. *Jellies.* (Lancs.)
B.6845. *Cream soups and canned spaghetti.* (Essex)
B.6847. *Micro switchgear.* (Scotland)
B.6848. *Chocolate novelty moulds.* (Yorks.)
B.6849. *Cheese pulverisers.* (Herts.)
B.6850. *Bacon curing and vanilla extraction.* (London)
B.6852. *Cheese powder.* (Jamaica)
B.6857. *Horseradish shredding equipment.* (Middx.)
B.6859. *Potato storage.* (N. Ireland)
B.6860. *Edible oils.* (London)
B.6861. *Insecticides.* (U.S.A.)
B.6862. *Liquid gravy browning.* (Ches.)
B.6864. *Mincemeat.* (Devon)
B.6866. *Canned ham.* (Ireland)
B.6868. *Popcorn.* (British Guiana)
B.6869. *Carragheen moss.* (London)
B.6872. *Meat tenderiser.* (Scotland)
B.6874. *Metal detectors.* (Sweden)
B.6875. *Containers and boxes.* (Surrey)
B.6876. *Crab meat.* (Glos.)
B.6879. *Edible vegetable dyestuffs.* (Lancs.)
B.6880. *Butter flavouring.* (Herts.)
B.6882. *Manufacture of butter colour.* (London)
B.6883. *Processing of pig blood.* (Yorks.)
B.6884. *Raisin stoning equipment.* (Ireland)
B.6885. *Peanut butter.* (Portugal)
B.6886. *Onions in brine.* (London)
B.6887. *Literature on walnuts and agar-agar.* (London)
B.6888. *Sage and onion stuffing.* (Ches.)
B.6889. *Whey powder.* (Oxon.)
B.6893. *Lug boxes for peas.* (London)
B.6894. *Apricot pitting equipment.* (London)
B.6896. *Alginate sausage casings.* (London)
B.6897. *Jelly manufacture.* (Warwicks.)
B.6898. *Enamel pails.* (Lancs.)
B.6899. *Pumping pickle.* (Ireland)
B.6900. *Pea viner waste treatment.* (Glos.)
B.6901. *Thick fruit sauces.* (London)

Information Required

B.6930. *Manufacturers of the "Combustor" sugar boiling stove with a Cox burner.* (Lancs.)

Recent Patents

702,302. SOLLICH, R.: Method of treating sugar solutions under vacuum conditions.

702,353. FORGROVE MACHINERY CO., LTD., and BROOK, L.: Wrapping machines.

702,380. MANNESMANN AKT.-GES.: Food storage arrangement proof against air attack.

702,450. KRARUP, F.: Clarification of cane sugar and other juices.

702,870. HUMKO CO.: Method of purifying saturated free fatty acid and the product thereof.

703,032. MÖLLER, R.: Mixing and kneading machine for various uses, especially for food industries.

703,104. MELVIN AND GILLESPIE, LTD., and TAYLOR, F. S.: Apparatus for disengaging the mixing bowl in a dough mixing machine.

703,142. RUTHNER, O.: Process for the continuous regeneration of waste pickling liquors.

703,242. IMPERIAL CHEMICAL INDUSTRIES, LTD.: Cleansing food handling equipment.

703,245. JOB, E.: Dough moulding machines.

703,363. IMPERIAL CHEMICAL INDUSTRIES, LTD.: Dehydration of castor oil.

703,383. HALL, E. O. S.: Machines for disintegrating and mixing foodstuffs, more especially vegetable foodstuffs.

703,384. SPANG, M. F., PECK, A. M., SPANG, W. F., SPANG, C. F., SPANG, R. L., LAMOTHE, B. L., SPANG, J. L., SPANG, T. J. G., SPANG, J. P., and McMANAMA, V. T. (trading as NEEDHAM MANUFACTURING CO.): Meat treating machine.

703,418. SALVO CHEMICAL CORPORATION: Manufacture of vanillin.

703,568. RAPER, W.: Means for forming and cooking doughnuts.

703,833. PAGE, A. C.: Handling of biscuits.

703,848. GIL AND CIA LTDA., P. S.: Nut husking machines.

703,859. CLARK, H. P. J., and BEECHING, P. S.: Wrapping material for foodstuffs.

ABSTRACTS OF BRITISH PATENTS

Fish-dressing Methods and Machines

Many proposals have been made for filleting cod and similar fish mechanically, but so far no machine has been wholly satisfactory and to this day all filleting of white fish in this country is done by hand.

The mechanical filleting of fish is a matter of great difficulty because the fish are received in various states of freshness and in consequence they differ from one another in the firmness of the flesh and the ease with which the fish can be held while the cuts are being made. Moreover, in any catch the fish naturally vary enormously in size so that a filleting machine must necessarily be of a complicated nature if the cuts are to be made close to the bones. The most difficult problem is to guide each fish firmly and precisely to the various knives.

The present invention is largely based on the appreciation that it is necessary to depart from the methods used hitherto and that for success the fish, while the cuts are being made on it, must travel tail first and belly downwards in a straight line in a single plane with its backbone straight.

701,650. *Rudolf Baader.*

Improvements in Wrapping Machines

Wrapping machines for wrapping "rolls" of circular tablets, lozenges, or like articles are described, each roll or package containing a number of tablets assembled to form a cylindrical stack, of the type comprising an intermittently moving chain conveyor having pockets for receiving the articles to be wrapped and serving to convey them along a horizontal path to a wrapping mechanism. There is also a feeding and assembly apparatus for depositing the articles side by side in the pockets of the conveyor, this apparatus comprising a table on which the articles are laid flat, a number of guides disposed side by side, extending in the lengthwise direction of the conveyor and leading from the table to the conveyor, plough blades in the guides for turning the articles on edge as they travel along the guides, and a gate for controlling the flow of articles from the guides into the pockets of the conveyor.

702,353. *The Forgrove Machinery Company Ltd.*

The Manufacture of Bread

If both ascorbic acid and crumb-softening agents, such as fatty acid esters of polyhydric alcohols, are added to the flour or dough, there is a synergistic action, with the result that bread which is superior to that obtained by using either of the said improvers alone can be obtained, even when the amounts added are below the optimum amounts for either alone.

According to the present invention, therefore, there is incorporated in the flour, or in the dough mixture to be used for baking bread, a small proportion both of ascorbic acid and of a crumb-softening agent, the amounts of ascorbic acid and crumb-softening agent being less than the optimum amounts when either substance is added alone.

It is to be understood that in general the flour treated in this way is the product milled from wheat which has not been treated with substances designed to improve colour and baking strength, for example, nitrogen trichloride and chlorine dioxide potassium bromate, although such treated flours might obviously be used if allowance be made for the agent already present in the flour. Thus, if treated flour is used, the amount of ascorbic acid added would in general be reduced.

700,869. *The British Baking Industries Research Association, John Bridgeford Maxwell Coppock, and Ruth Bennett.*

Tanks for Moulding Jellies

The moulding tank described is particularly adapted for moulding table jellies, but the invention also includes tanks for moulding other foodstuffs such as cheese, chocolate, meat cubes, and so on in the preparation of which the removal of scum during moulding is a problem.

The tank comprises a container with a displaceable front end wall so disposed that when the wall is displaced, slabs or blocks may be taken out of the container in a substantially horizontal direction after moulding, removable separating plates to divide one moulded slab or set of blocks from an adjacent slab or set of blocks, means to retain the separating plates in correct position within the container, and a scumming basin disposed outside the rear end wall of the container into which scum may be directed, the rear end wall of the container being slightly lower than the other walls to facilitate the collection of scum within the basin.

The displaceable front end wall of the container may be completely removable from the container or may be hingedly secured in position in order that it may be displaced by being swung into the inoperative position. The slabs and blocks moulded in the container are preferably square or rectangular, but if desired blocks of other shapes may be moulded as desired, such shapes being other simple geometrical forms.

701,841. *Frederick Robert Taylor.*

Meat Tenderising Machines

Tenderising machines are described in which the meat tissues are not torn from the meat, the rolls and other parts do not become clogged or may be easily cleaned, the whole being of simple but sturdy construction and thus simple to manufacture, operate, and maintain in a clean condition.

Such a machine has a number of knife roll assemblies each mounted in a frame which can be removed separately from the machine, the knife roll shafts being journalled in bearings attached to or integral with the frame which are adapted to be supported in the machine on brackets or the like on the machine housing, and means are provided for separately removing each knife roll assembly within its frame from the machine housing.

Substantially straight strippers in the form of parallel spaced bars secured at each end to cross members, are detachably mounted on the roll frames, so that the bars lie between the knife discs or plates. The top cross members of the strippers may be provided with members forming a feed chute for the machine. The machine housing is closed by a lid having an aperture therein which when the strippers and knife rolls are in place in the machine, lies immediately above the top of the chute. Alternatively, the chute may be arranged on the inner side of the lid in register with the slot therein, in which case the strippers are not provided with chute forming members.

700,403. *Lan-Elec Limited, Douglas Melville Read, John Staples, and Jozef Longin Anecki.*

Drawing Out Fruit Stones

This invention relates to a new and useful method of and apparatus for drawing out, or extracting, the stones from cherries and/or from other fruits of similar character, such as hard black cherries, apricots, plums, peaches, and other fruits of the type having an outer relatively soft edible and pulp-like body encasing an inner hard inedible kernel, or stone.

More particularly, the new method and the apparatus for carrying it out are devised for the production of stoneless fruits of the above character, intended for successive treatment into candied fruit form and other commercial purposes wherein stoneless fruits are desired.

700,669. *Thérèse Cavanna.*

Trade Marks

CHOCOMEL.—691,752. Chocolate couvertures for use in the bakery, confectionery, and ice cream trades. **Cereal Products (Northern Ireland), Limited,** Cereal House, 93, Holywood Road, Belfast, Northern Ireland; Manufacturers and Merchants.

LYONS.—695,001. Chocolate, sugar confectionery (not medicated), custard powder, Christmas puddings, pies, cakes, flour confectionery, bread, bread rolls, tea, coffee mixtures of coffee and chicory, and ice cream. **J. Lyons and Company, Limited,** Cadby Hall, London, W.14; Merchants and Manufacturers.

ROSENBORG.—705,443. Cheese for sale in England and Wales. **Esper Boel** and **Jeppe Boel,** trading as **Boel Brothers,** Marslev, Denmark: Manufacturers.

PELKMAN.—706,286. Proving installations incorporating heating and humidifying apparatus, for use in the bakery trade; and bakers' ovens. **Pelkman Brothers, Limited,** 1-3, Brixton Road, London, S.W.9; Manufacturers.

WHITE HEATHER.—711,522. Shortbread. **William Beattie, Limited,** Dennistoun Bakery, 116, Paton Street, Glasgow, E.1; Manufacturers.

KENWOOD.—712,436. Machines for mixing, pulping, grinding, mincing, and shredding foodstuffs; and machines for peeling vegetables. **Kenwood Electrics, Limited,** Kenwood Works, Ripley Street, Old Woking, Surrey; Manufacturers.

SUN-PAT.—713,868. Food preparations made from alimentary pastes, and popcorn. **H. S. Whiteside and Company, Limited,** Parkhouse Works, Parkhouse Street, Camberwell, London, S.E.5; Manufacturers.

SERGEANT DAN.—714,782. Flour, oatmeal, and cereal products for food for human consumption. **Creamoata, Limited** (a Public Company incorporated under the laws of the State of Victoria, Australia), Sunshine Road, West Footscray, Victoria, Australia; Manufacturers.

CHEEZ WHIZ.—714,930. Cheese, cheese spreads, and preparations consisting principally of cheese for use as food. **Kraft Foods, Limited,** Silverdale Road, Hayes, Middlesex; Manufacturers and Merchants.

KOMINATOR.—715,613. Machines for the processing of animal and vegetable edible fats, and homogenising machines. **Herrmann Friedrich Rudolf Knollenberg** trading as **Schroder and Company,** Falkenstrasse, 57, Lubeck, Germany; Manufacturer and Merchant .

QUORN.—716,113. Jellies (for food), jams, fruit curds, marmalade, desiccated coconut, preserved fruits and soups. **Quorn Specialities, Limited,** Knighton Junction, Welford Road, Leicester; Manufacturers.

STARLET.—716,763. Biscuits (other than biscuits for animals) not being chocolate biscuits or chocolate coated biscuits. **Danubia Bakeries, Limited,** 62, Herries Street, Queens Park, London, W.10; Manufacturers and Merchants.

LUXOR.—717,663. Ginger marmalade, pineapple conserve, rhubarb jam, mincemeat, lemon curd, pickles, and jellies (for food). **William Pender, Limited,** East Silvermills Lane, East Silvermills, Edinburgh, 3; Manufacturers.

LAUREL.—717,951. Jams, marmalade, lemon cheese, and table jellies. **H. Smith (Purito Products), Limited,** Victoria Mills, Mossley, Lancs.; Manufacturers.

STELLA.—718,729. Edible fats, not of hog origin and not including margarine or butter. **Auguste Pellerin, Limited,** "Le Dansk" Factory, Northam, Southampton; Manufacturers.

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PENNANT.—720,222. Hams and canned meats. **Brown and Knight, Limited,** 9-10, Lower Marsh, Lambeth, London, S.E.1; Manufacturers and Merchants.

GLUCOLA.—720,229. Glucose and preparations containing glucose, all for use as food or as ingredients in food. **James Laing Son and Company (Manchester), Limited,** Ashburton Road, Trafford Park, Manchester; Manufacturers.

CHEEMELLO.—720,545. Cheese. **Libby, McNeill, and Libby, Limited,** Forum House, 15 and 16, Lime Street, London, E.C.3; Manufacturers and Merchants.

DANNY-COLA.—720,574. Food flavourings (other than essential oils) containing cola extracts. **H. E. Daniel, Limited,** St. Bernard Works, Stoney Lane, Upper Norwood, London, S.E.19; Manufacturers.

CINDAIRA. — 720,757. Preparations consisting principally of sugar for use as a filling for confectionery. **Rice's Ice Confections, Limited,** 431, Great West Road, Hounslow, Middlesex; Manufacturers.

New Companies

Stockley Brothers (Accrington), Limited. (526107.) Newark Street, Accrington. To carry on business of manufacturing and wholesale confectioners. Nom. cap.: £2,000 in £1 shares. Dirs.: Mrs. A. Stockley, 87, Avenue Parade, Accrington; V. Stockley, 8, Devon Avenue, Oswaldtwistle, and W. Stockley, 5, Barnfield Street, Accrington.

West Kent Cold Storage Company, Limited. (526183.) 32, Victoria Street, London, S.W.1. Nom. cap.: £300 in £1 shares. Dirs.: W. Davison, The Poplars, Church Road, Sundridge, Kent, and Lieut.-Col. D. A. Collier, The Old Stone House, Westerham, Kent.

E. and J. Fountain, Limited. (526199.) To carry on business of millers, flour, meal, offal, corn, wheat, and grain and provender merchants. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: E. Lyall and R. G. Norton (solrs.), 18, Austin Friars, London, E.C.2.

Southern Counties Canned Food Suppliers, Limited. (526309.) Portman Chambers, 7-9, Baker Street, London, W.1. Nom. cap.: £1,000 in £1 shares. Dirs.: A. Robens, 13, Prentis Road, London, S.W.16, and S. Hargreaves, 19, Bank Hey Lane South, Blackburn.

Pure Conserves Manufacturing Company, Limited. (526489.) 7, Marks Road, Warlingham, Surrey. Nom. cap.: £100 in £1 shares. Permt. dirs.: G. H. Boxall and Mrs. E. B. Boxall, 7, Marks Road, Warlingham, Surrey.

Cabin Confectionery, Limited. (526506.) 6, Queens Terrace, Exeter. To carry on business of manufacturers of and dealers in chocolates, sweets, and confectionery. Nom. cap.: £6,000 in £1 shares. Permt dir.: G. J. Greenslade, 60, Velwell Road, Exeter.

Barry Woodcock and Company, Limited. (526712.) 43a, Caves Road, St. Leonards-on-Sea. To carry on business of manufacturers of and dealers in confectionery. Nom. cap.: £6,000 in £1 shares. Dirs.: F. J. Woodcock, 90, Cranston Avenue, Bexhill-on-Sea; A. C. Woodcock, 107, Milward Road, Hastings; Doris E. M. Woodcock, and Edna M. Woodcock.

Crispan Golden Savouries, Limited. (526797.) 185, Worthing Road, Sheffield, 9. To carry on business of producers, manufacturers of and dealers in cooked foods, potato crisps, and fish products. Nom. cap.: £4,000 in £1 shares. Dirs.: H. Taylor, Green Edges, Moorgate, Rotherham; W. J. Jenks, Rosslyn, Doncaster Road, Rotherham; Marjorie M. Taylor, and Dorothy M. Jenks.

Southern Cocktail Products (Worthing), Limited. (527064.) 12a, Eldon Road, Worthing. To carry on business of general merchants, manufacturers of and dealers in foodstuffs and alcoholic and non-alcoholic liquids of all kinds. Nom. cap.: £300 in £1 shares. Dirs.: J. P. Drummond, Flat 2, 106, Brighton Road, Lancing, Sussex; J. E. B. Thatcher, 4, Bath Place, Worthing, Sussex, and S. G. Malandain, 40, Richmond Road, Worthing, Sussex.

Scribbans-Kemp (Export), Limited. (527074.) Africa House, Kingsway, London, W.C.2. To carry on business of bakers, confectioners, exporters, importers, and merchants of and dealers in foodstuffs, provisions, goods, and produce. Nom. cap.: £10,000 in £1 shares. Dirs.: W. Clayton, D.Sc., F.R.I.C., 11, The Drive, Orpington, Kent; F. N. Martin, A.C.A., 53, Lake View, Canons Park, Edgware, Middlesex; Maj.-Gen. G. P. B. Roberts, C.B.E., D.S.O., M.C., and A. W. Saunderson.

Bycroft and Company (Holdings), Limited. (527110.) 78, Vincent Parade, Balsall Heath, Birmingham, 12. To acquire the business and undertaking of Bycroft and Company, Ltd. (in liquidation) and to carry on business of manufacturers of and dealers in chocolate and confectionery. Nom. cap.: £25,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: W. Bycroft Roberts, 36, Reddings Road, Moseley, Birmingham, and R. D. Roberts, 19, Strensham Hill, Moseley, Birmingham.

D. M. Abel and Company, Limited. (527196.) Victoria Chambers, Victoria Road, Swindon. To carry on business of confectioners, bakers, biscuit manufacturers and pastrycooks. Nom. cap.: £100 in 5s. shares. Dirs.: D. M. Abel, Whiteladies House, Alme Road Avenue, Bristol, 8, and H. Ball, 16, Southview Avenue, Swindon.

Hedley Vickers, Limited. (527431.) Sherborne Street, Cheetham, Manchester. To acquire the business of meat packers and manufacturers of and dealers in preserved and potted meats and other canned goods carried on at Cheetham by Hedley Vickers (Holdings), Ltd. Nom. cap.: £20,000 in £1 shares. Dirs.: not named. Subs.: W. J. Exley, Benesque, Bramhall Moor Lane, Hazel Grove, Cheshire (clk.), and R. Cooke, 24, Kennedy Street, Manchester, 2 (solr.).

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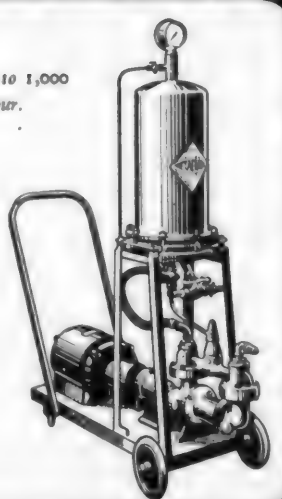

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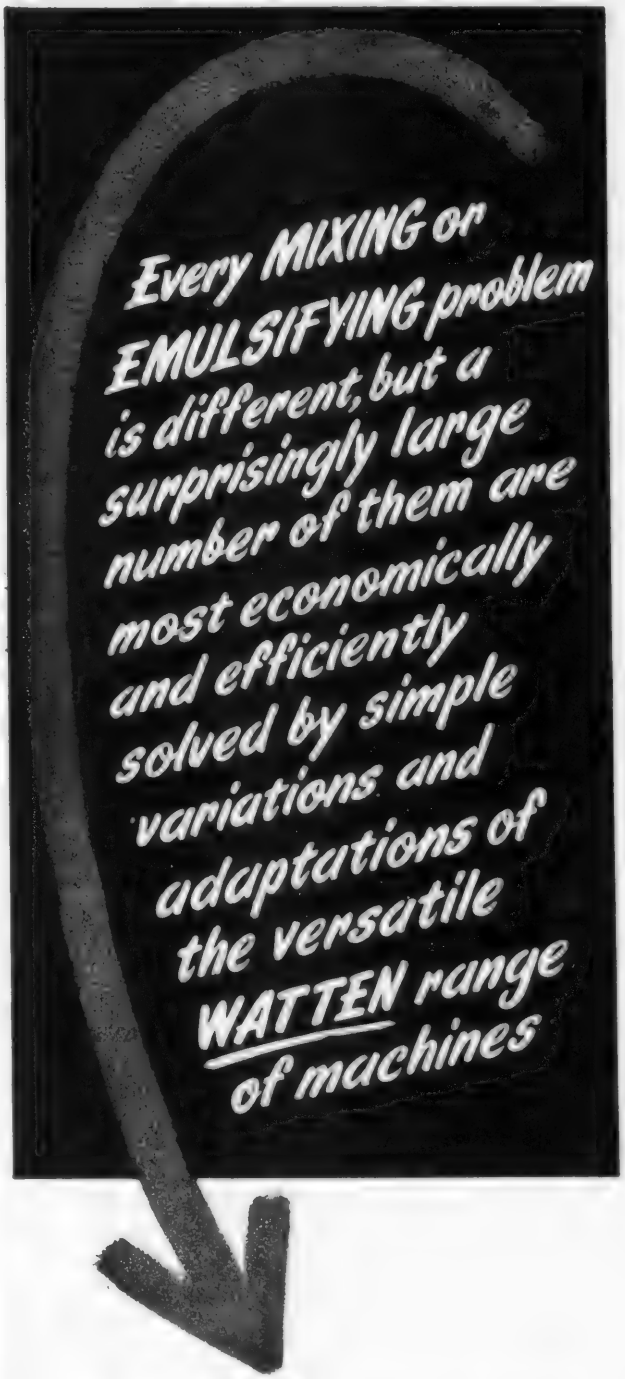

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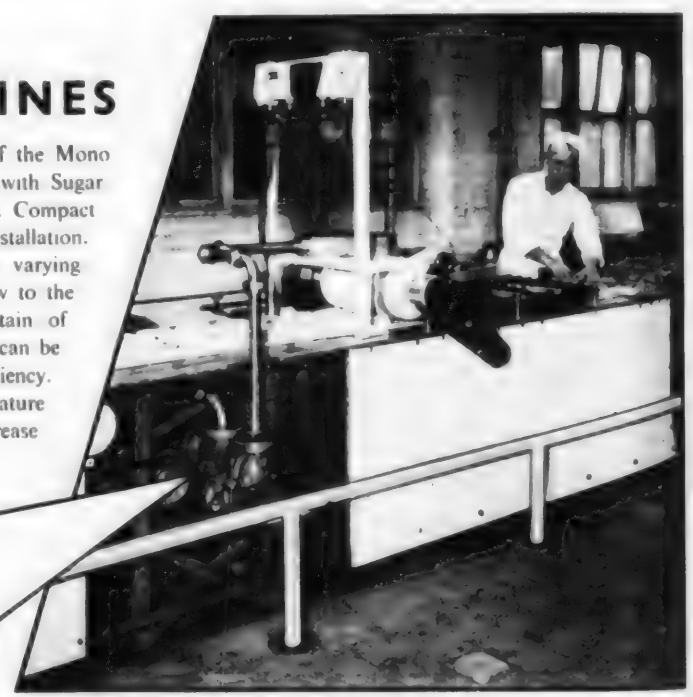

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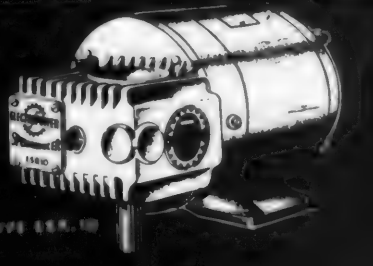

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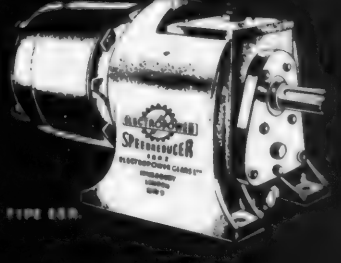

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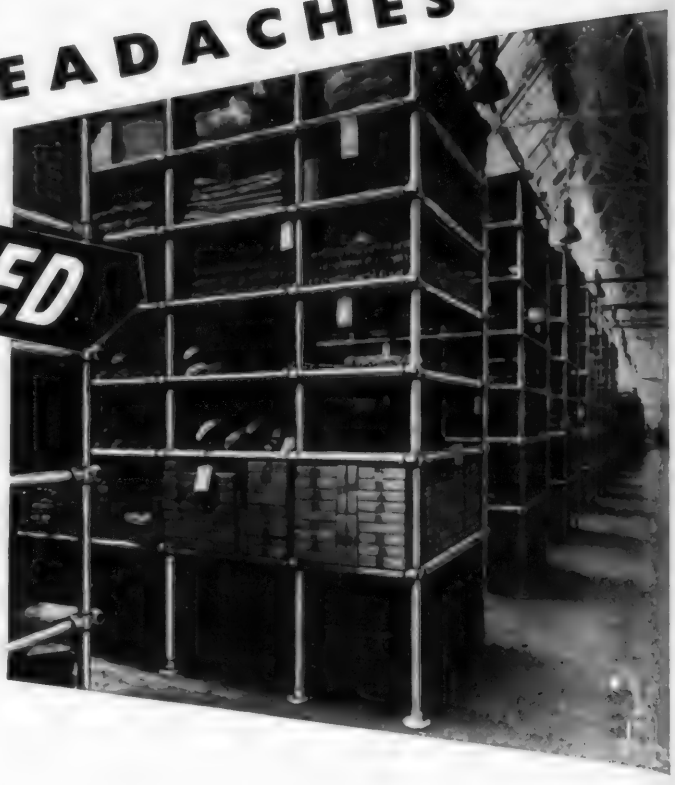

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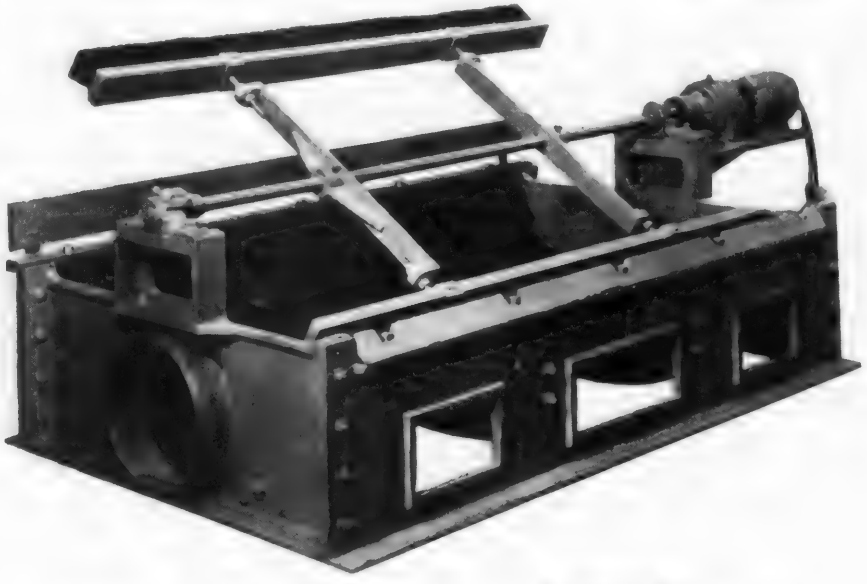

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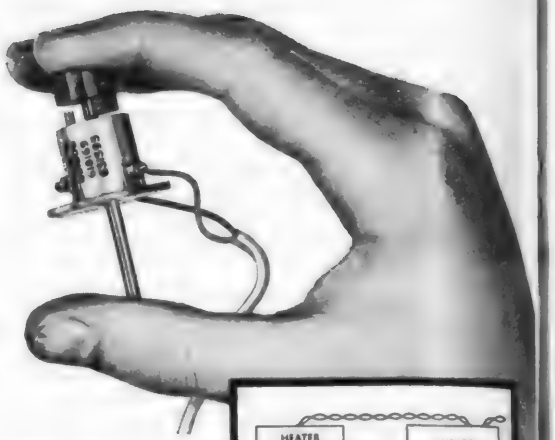

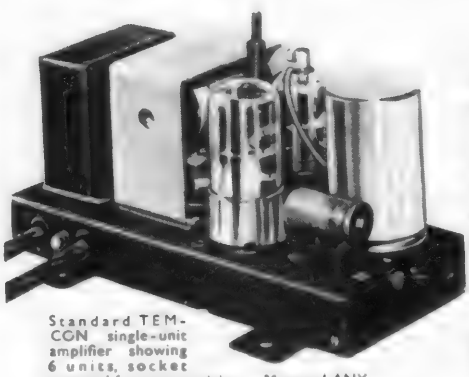

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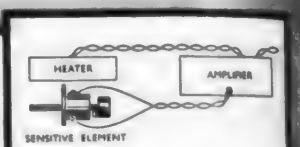

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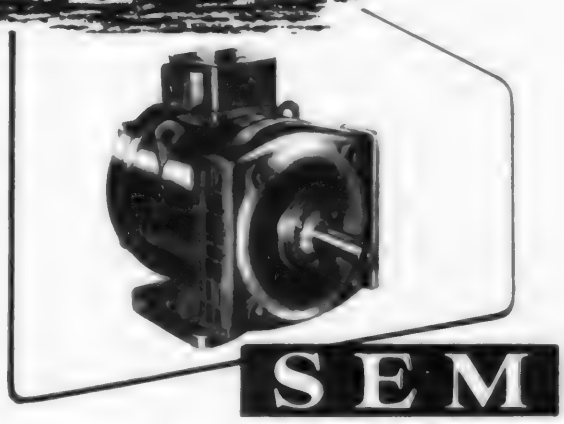

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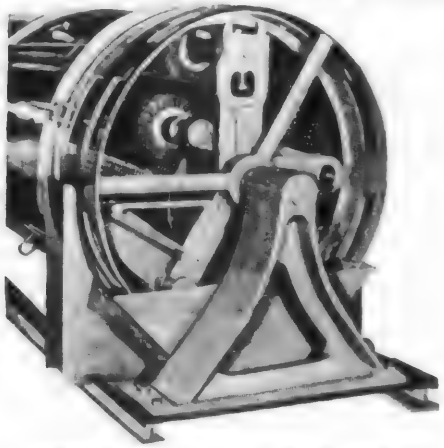

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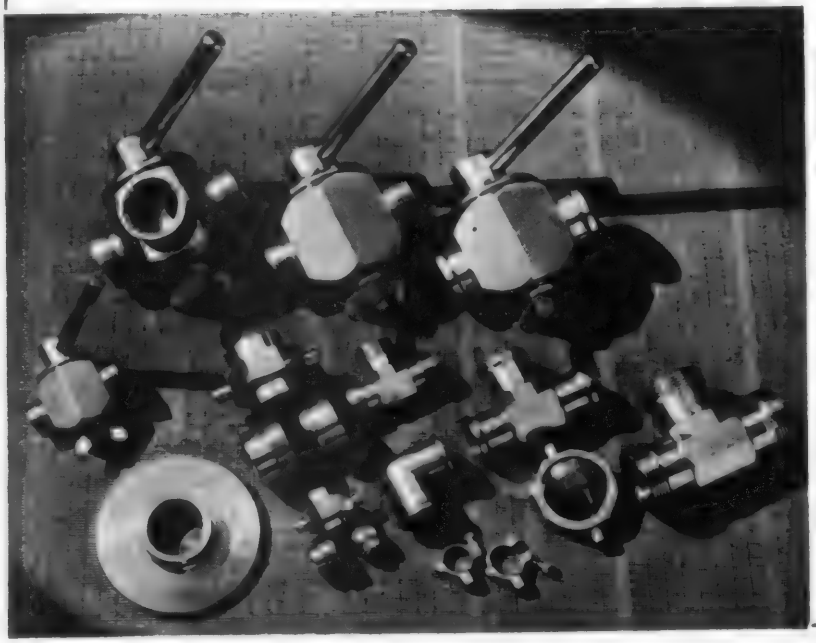

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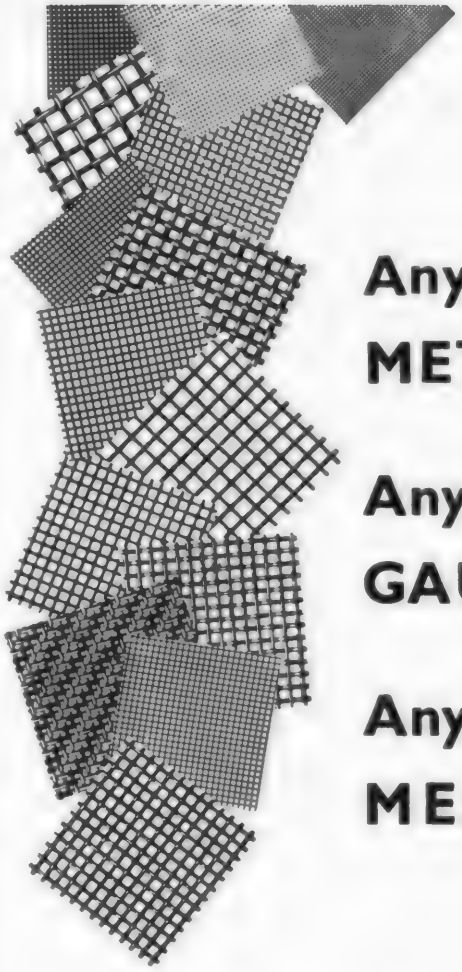

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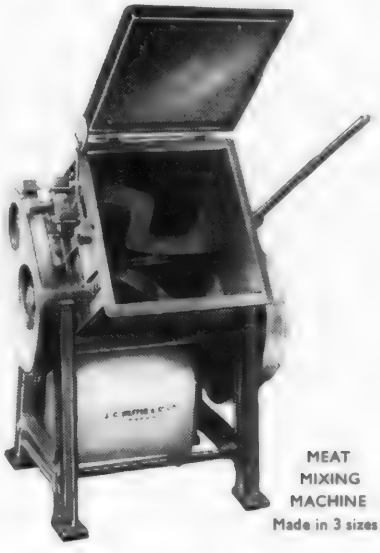

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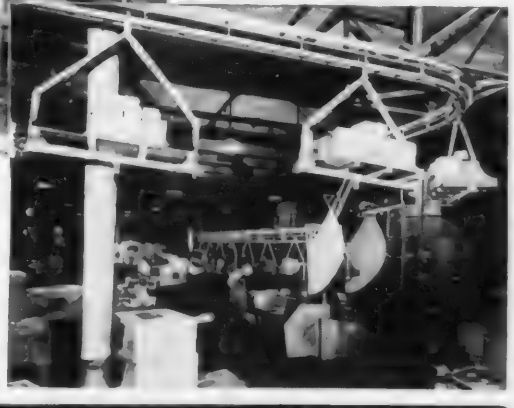
Above: *The Teleflex dual-directional chain Conveyor adapted to carry tins of biscuits.*



Right: *Overhead chain conveyor carrying cigarettes in packing and despatch departments at the factory of Messrs. W. A. & A.C. Churchman.*

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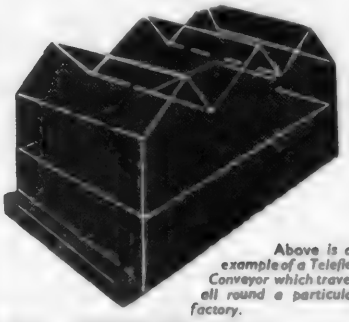

Above *is an example of a Teleflex Conveyor which travels all round a particular factory.*

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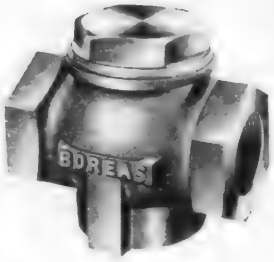

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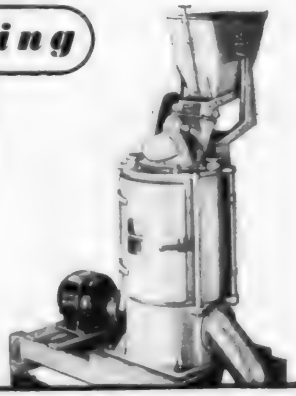

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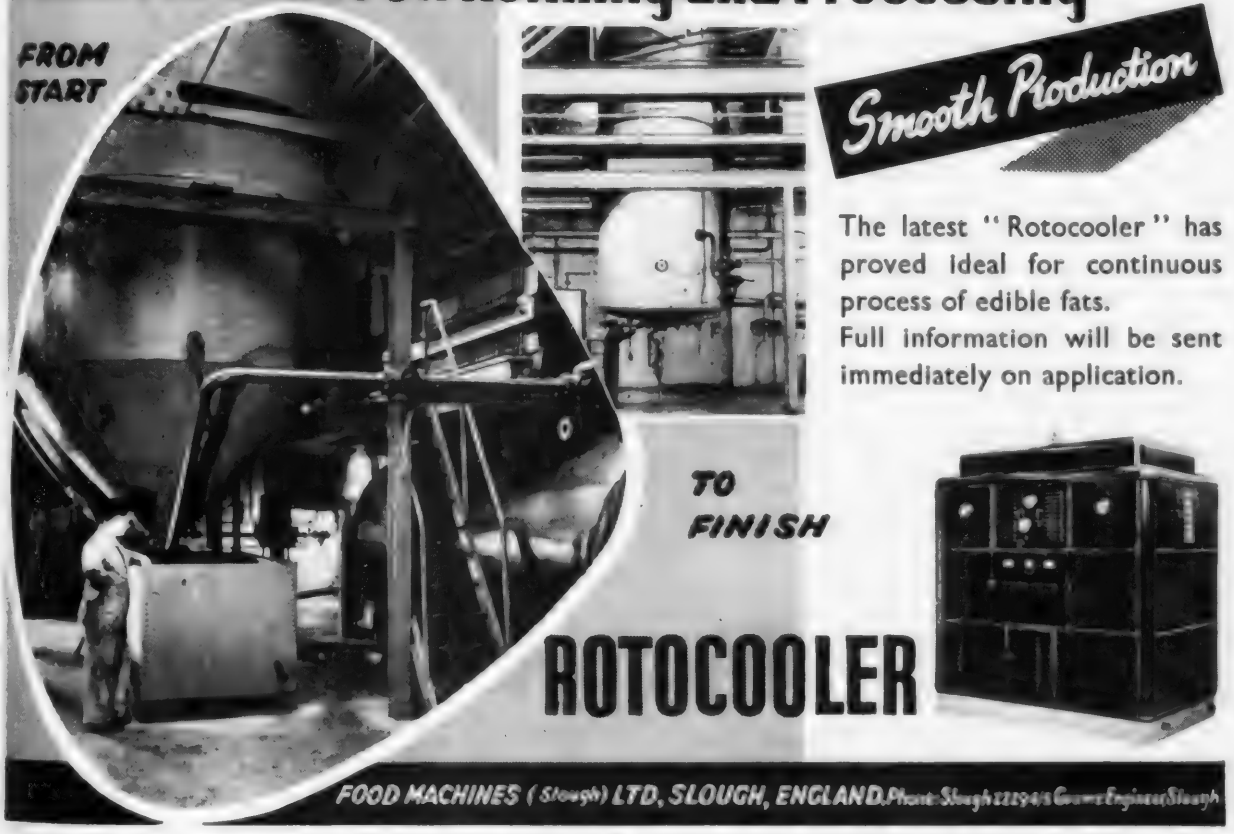

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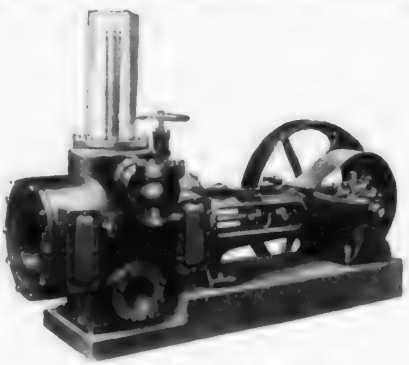

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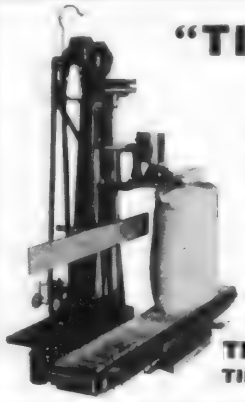

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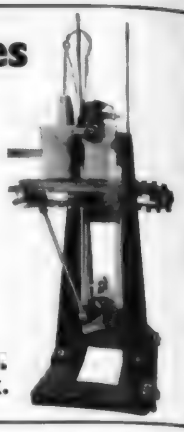

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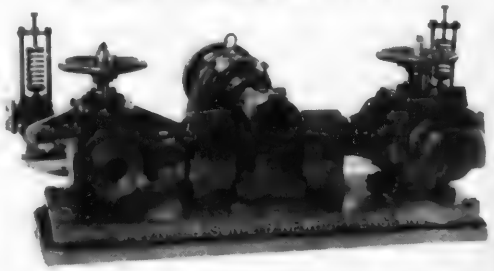

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FOR DETAILS OF SITES AND FACILITIES – APPLY –
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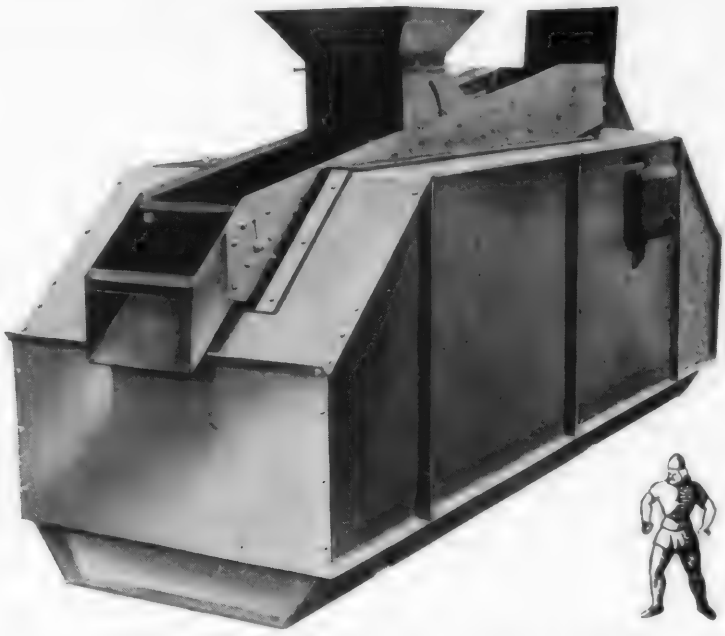
an efficient stalk and stone remover

This machine was designed and manufactured by Saxon Engineering for the removal of small stones and stalks from raisins, sultanas and similar small fruit. It is installed at the London factory of McVitie and Price where it has eliminated the laborious manual process previously used. We will gladly forward full details on request.

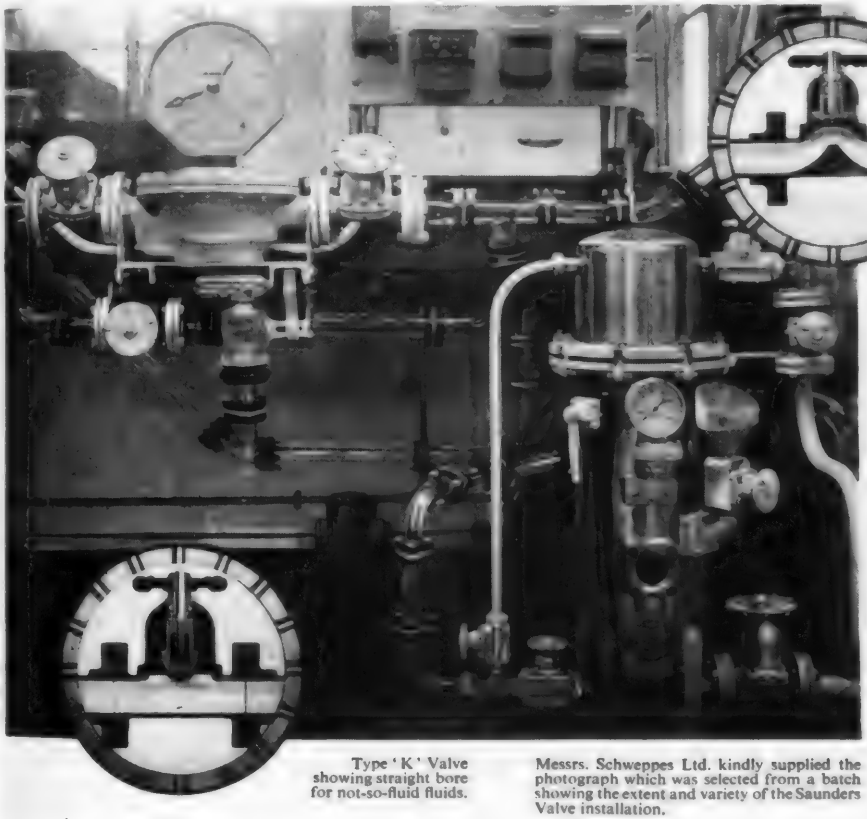


SAXON STALK AND STONE REMOVER

for small fruit

SAXON ENGINEERING CO LTD FENTON STOKE-ON-TRENT *TEL.: LONGTON 33822. GRAMS: 'SECO' STOKE-ON-TRENT*

P4166/B



Type 'A' Valve showing complete isolation of mechanism.

Type 'K' Valve showing straight bore for not-so-fluid fluids.

Messrs. Schweppes Ltd. kindly supplied the photograph which was selected from a batch showing the extent and variety of the Saunders Valve installation.

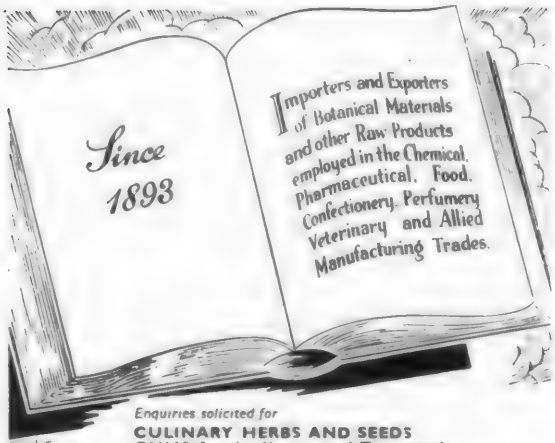
Edible fluids hygienically handled

In their new Soft Drinks Factory at Aintree Messrs. Schweppes Ltd. have installed the sure and hygienic control of Saunders Diaphragm Valves for handling syrups, fruit juices and the fluids involved in the manufacturing processes.

Glass-lined Type 'A' Valves handle the glass-piped fluids to and from the syrup flowmeter. Type 'K' and Ebonite Bodied Type 'A' Valves regulate fluids to and from the filter. All are hygienic and sure in action and in inaction, for the diaphragm closure of the Saunders Valve is perfect even when pips are present in the fluids.

SAUNDERS DIAPHRAGM VALVES

SAUNDERS VALVE COMPANY LIMITED CWMBRAN MONMOUTHSHIRE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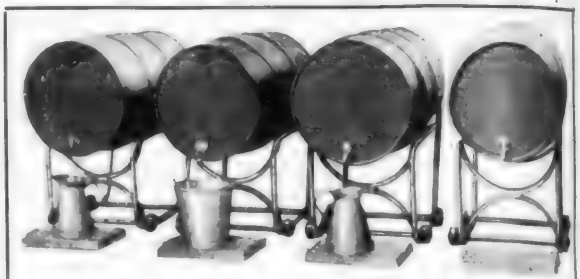

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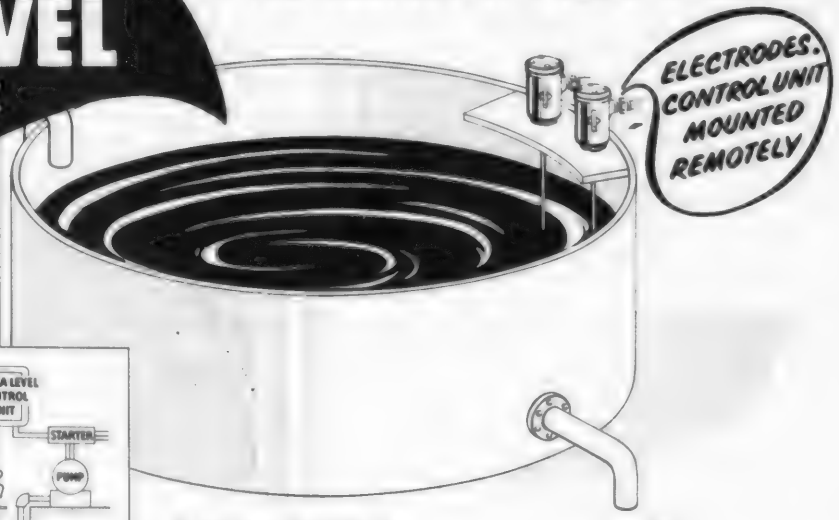

The LECTRALEVEL floatless Level System is a simple foolproof method of controlling liquid levels by means of a small electric current and stationary electrodes. No floats are required.

The unit will maintain the level in a tank by controlling either a valve or a pump.

This floatless system can be used for indicating purposes, operating lamps of different colours for low, medium and high levels. These signals can be combined with an audible alarm and a self-resetting alarm cancelling device. Electrodes and holders available for all applications.

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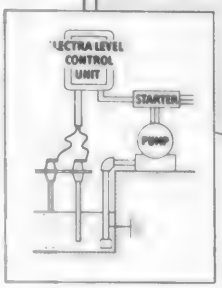

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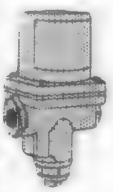

The standard valve is provided with ⅛", ¼" or ⅜" B.S.P.T. Connections and 3/32" orifice (5/32" seat diameter) to operate on pressures up to 100 lbs. per square inch. An increased size orifice can be arranged dependent upon the pressure to be controlled. This valve is suitable for controlling water, air, oil, gas, refrigerants, etc., and is adaptable to either straight or angle pattern.

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FOR Sale: Two Kellie Pea-podders. Very little used.—Unicream Ltd., Broughton Lane, Manchester 7.

WATTES Emulsifer type LAB surplus to requirements. Capable of dealing with mixes of up to 10 gall. ½-h.p. universal motor. New condition. Price £50.—Harringtons Ltd., 6, Grosvenor Road, Tunbridge Wells.

TWO MLG Wrapping Machines by Rose Brothers to wrap Cartons size 3 1/16 in. by 5⅛ in. by ⅜ in. in transparent film, complete with paddle wheel delivery and ½-h.p. motors. Can be seen in London subject to being unsold. —Offers to Box B4567.

LIMITED number of new "Stirrer Gate" Agitators, fitted with vertical moss 5 h.p. 1,000 to 20 worm reduction gears, 3½ in. diam. stainless steel drive shafts with s.s. paddle gates attached; also several new 10 h.p. Wallwork reduction gears, 9 in. centres, ratio 210 to 18, vertical output shaft, with 6 ft. 6 in. by 1 ft. 10 in. c.i. bed plate if required.—Woodfield and Turner, Burnley, Tel.: 3065.

GIANT "Wetter" all-purpose crushing, grinding, shredding and/or mincing machine complete with 50 h.p. slipring motor and combined stator and rotor starter for A.C. 3-phase power supply; 9 in. worm drive with knives and plates.—May be seen in current use and perfect running order at Golden Block Margarine Works, Letchworth, Herts.

C. AND E. MORTON LTD., offer for immediate sale, the following Equipment: Mather and Platt Ltd., one Duo Washer, complete with drive and motor platform; one Stero Washer, complete with motor; one multi Tier Continuous Steam Exhauster suitable for fish cans, complete with motor and feed track. Arenco: two Nobbing Machines, type C.I.D. Bon-Accord: one Continuous Chain Exhauster suitable for all can sizes up to A2½, complete with VS gear and motor. I.M.C.: one Scott Hi-Eff Flotation Washer for Peas and similar products. All motors are for standard A.C. current. Inspection of the above plant may take place at our Lowestoft factory by appointment. Further details on request.—C. and E. Morton Ltd., South Wharf, Lowestoft.

PLANT FOR SALE

FOR Sale: one Philips Macro 100 Industrial X-ray Unit, stationary model in good condition. —Any reasonable offer considered. Box B4580.

FOR Sale: Complete Biscuit Making Plant comprising: two sack Dough Mixer by T. and T. Vickers; 32 in. Dough Break by Baker Perkins; Biscuit cutter with sizing rolls by Baker Perkins; Travelling chain gas-fired Oven by Baker Perkins; Christie and Norris Disintegrator; all units motorized 400/3/50.—Full details from Box B4588.

FOR Sale: Gravity Conveyors, rollers 14 in. wide on 6 in. centres with bends; "Crypto" 40-qt. 3-speed electric Mixer and Mincer; "Portway" 3-tier, gas-fired Pastry Oven; controlled flame fully automatic gas-fired Steam Boiler, 41 in. by 20 in. diam., 155 lb. evaporation; also 7 ft. by 3 ft. Lumby Cross-tube Boiler, 400 lb. evaporation, 100 lb. pressure, as new.—A. H. Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

VARIOUS Coffee Essence Plant; New Flock Catcher; Ingersoll Rand Compressor; B.C.H. 1 in. Monel Pump; two Roberts Bottle Filling Machines; Alite Filler; two Ericeson Pie Machines; A.P.V. stainless steel Pulper; Purdy New-way Can Labelling Machine; LaBour Monel Pump; two Ramsden 50-gall. s.s. Boiling Pans.—Box B4589

COMPLETE Grinding Unit, suitable for sugar or products requiring very fine grinding. Micro pulveriser, fan, cyclone, air-seal, sieve. Exhaust trunking. Dust collector, filter sleeves. Stock hopper, vibrator feeder, variac control. Easyclean magnet. Auto-packer 14-140 lb. with all motors. £1,200 or nearest offer.—Box B4547.

COMBINED Sifting and Mixing Machines for powders, up to two tons capacity. 3-cwt. and 5-cwt. sizes in stock.—Makers: D. Burr and Son Ltd., Drayton Place, Croydon.

ONE No. 100 18 in. Rapid Grinding Mill by the Whitmee Engineering Co. Ltd., London, S.W.12. Brand new.—Offers to Lloyd Rakusen and Sons Ltd., Meanwood Road, Leeds, 7.

HOMOGENISERS, several sizes, excellent condition. Also stainless steel Pasteuriser and other equipment.—Box B4515.

SECOND-HAND PLANT WANTED

SECOND-HAND Newman Labelling Machine required. Good price given for machine in sound condition.—Box B4569.

MIXER wanted, new or second-hand. Horizontal batch type preferably 3-5 cwt. capacity.—Box B4577.

EXHAUSTER for Canned Fruit (steam or water). State price and details.—Park Farm Preserves Ltd., Winchcombe, Glos.

WANTED: Semi-automatic Irregular Seamer, mainly for odd shapes and Fish-cans.—Esko Products Ltd., Finaghy, Belfast.

URGENTLY required: two compressed air power Sausage Fillers, capacity 150-200 lb. Twin nozzles preferred but not essential.—Gaylord House Ltd., Rennie Street, Salford 5

WANTED: Steam jacket Vertical Mixer (Caramel Pan). Retractable mixer, working capacity 1½ cwt. Overall 30 gall., size 26 in. by 20 in., single-speed drive, tilting pan; Cooling Copper Vat, approx. diam. 40 in., approx. depth 12 in., gravity outlet.—A. Goldrei and Co. Ltd., Tabard House, 116, Southwark Street, London, S.E.1.

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SITUATIONS VACANT

OLD Established Cocoa and Chocolate Manufacturers in the north-west London outskirts require young man to take charge of their laboratory. Analytical experience of cocoa and chocolate essential. Staff contributory pension scheme in operation.—Application should be made stating age, experience, qualifications and salary required to Box B4571.

CHEMIST with University degree or equivalent and practical experience of food manufacturing processes, required to take charge of laboratory and exercise technical and bacteriological control of production, quality of output, etc., in important new fruit processing and canning factory in Nigeria. Good salary according to qualifications, house provided, liberal home leave, first-class passages.—Apply in confidence stating full details past experience, age, married or single, when available to Box B4583.

MANAGER required for Spray Milk Powder Creamery, state in confidence full particulars of previous experience, length of service, age, wages received and required.—Box B4579.

FISHING Industry Research Institute, Cape Town, South Africa. Applications are invited for the post of Research Officer on the Institute's permanent establishment. Applicants must be graduates in Physics, Mechanical Engineering, Physical Chemistry, or Chemical Engineering, and preference will be given to those with some experience of research in the preservation, processing and transport of food, preferably fish. The salary offered is on the scale £600 by £60—£900 by £60—£1,200, plus a cost of living allowance of £352 p.a. for married and £176 p.a. for single men. Qualifications and experience will be taken into account in determining the commencing salary, previous experience being recognised at the rate of approximately one salary notch for each year of appropriate experience to a maximum of £1,140 p.a. Further progression, which can be rapid, will depend entirely on merit and prospects exist for promotion in due course to Principal Research Officer on the scale £1,200 by £60—£1,500. The Institute is affiliated to the University of Cape Town and the staff contributes to a provident fund at the rate of 7% of basic salary. The Institute works a five-day week. Reasonable transport costs of the successful candidate and his family to South Africa, will be paid by the Institute.—Applications must be posted to reach the Secretary, P.O. Box 1233, Cape Town, South Africa, on or before April 30, 1954.

FOOD Technologist required to act as Factory Manager in small factory producing fish and vegetable conserves and preserves, East London.—Write giving full details age, experience, present salary, etc., to Box B4592

PRODUCTION Manager required by Fish Delicatessen Manufacturers, Leyton, E.10. Knowledge of fish-paste production or pickle manufacture an advantage.—Full details age, experience, etc., to Box B4593.

PRODUCTION Manager required for large Biscuit Company with modern band plant machinery. Must be thoroughly experienced in all branches of biscuit production. —Please state age and experience to Box B4597.

MANUFACTURERS and distributors of prepared materials and speciality products to the bakery and confectionery trades are seeking a Food Technologist who has knowledge of, and experience in the above trades, for research work and the origination and development of new products applicable to the above. Applicants who must be capable of working independently and without supervision, and possessing the necessary qualifications, should give details of experience and salary required. —Box B4598.

FOREMAN CHARGEHAND required for shift work at milk powder factory using the spray process. State previous experience in full, age, wages received and required, in confidence. Box B4587.

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Food Manufacture, Stratford House, 9 Eden Street, London, N.W.1

SITUATIONS VACANT

THE University of Leeds. Applications are invited for Imperial Chemical Industries Limited Research Fellowships in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemotherapy, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Protein Chemistry and Wool Textile Engineering). The Fellowships will be of an annual value within the range £600-£900 a year according to qualifications and experience and will normally be tenable for three years. Further particulars can be obtained on request. Three copies of applications (one in the case of applicants from overseas), together with the names of two referees, should reach the Registrar, The University, Leeds, 2, not later than April 21, 1954.

A DESIGNER with first-class experience on machinery used for sugar boiling and the manufacture of sugar confectionery is required by important manufacturers of machinery for the trade. The Company is well-known and enjoys high reputation both as employers and for its products.—Applications should give full details of age, training, situations held and salaries earned in chronological order and should be addressed to Box B4600.

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BUSINESS Man early forties, with excellent connections, wide experience and comprehensive knowledge of the food trade generally, now assistant sales manager, seeks opening with prospects. Any reasonable proposition considered. Area greater London.—Box B4585.

BUSINESS OPPORTUNITIES

OLD Established firm of Food Manufacturers and Distributors expanding on a national basis are prepared to purchase similar businesses at present operating at a loss. Principals only of firms already engaged in, or having the facilities for the manufacture of sausages and open-pack meat products, with or without canning capacity, but with an existing sales organisation, are invited to send initial details which will be treated in strictest confidence.—Box B4573.

PACKAGING, Bottling, Manufacturing and Warehousing Facilities are available in the North of England. A well-known firm of northern food manufacturers have the above facilities available as a result of extensive modernisation of their factory. This should interest Southern Food Manufacturers as one possible way of overcoming today's high carriage and distribution costs. The cost of these services will be calculated at a minimum rate and all enquiries should be addressed to the Managing Director.—Box B4576.

ENGLISH Canners seeking National Distribution for their products are invited to communicate with G. Havinden Ltd., 71, Baker Street, London, W.1., who have active sales force covering all leading food outlets.

PROPRIETORS of Modern Dublin Food and Confectionery Factory wish to contact British Food Manufacturers who may be interested in having their lines manufactured and/or packed in Dublin for home and export markets. Exclusive use of modern Factory and Plant. 8,000 sq. ft. manufacturing space, steam, refrigeration and first-class spacious office accommodation. All conveniences. If required proprietors would consider taking financial interest in sound proposition.—Box B4582.

FOOD Manufacturers offer first-class facilities for manufacturing and distributing throughout Northern Ireland. Good delivery fleet, ample storage accommodation conveniently situated in Belfast, long term arrangements preferable.—Box B4578.

FOOD Manufacturer has productive capacity available involving use of vacuum ovens, also packing facilities.—Box B4590.

SELF RAISING Flour and Agric. Merchants Business offers Directorship with a view to control. Pleasant south-west coastal town. Good machinery, modern transport and valuable freehold premises. Further manufacturing space available. Well established, distribution to grocers and bakers in two counties.—Box B4594.

WANTED: Company with spare spray-drying capacity to undertake the contract for spray-drying of a specialised food product.—Replies to Box 921, Arthur S. Dixon Ltd., 229, High Holborn, W.C.1.

THE Proprietor of British Patent No. 566050 for "A Method of Disinfecting Intestines or Products Made Therefrom," desires to enter into negotiations with a firm or firms for the sale of the patent, or for the grant of licences thereunder.—Further particulars may be obtained from Marks and Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

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KELLIE type 4 F.P. automatic Jam Filling Machine with jar conveyor and cups for 1-lb. and 2-lb. jars. Fully motorized and in first-class condition.—Apply Box B4591.

MANUFACTURER has for disposal Food Machinery: Blanching, Splitting, Grinding, Sieving, Disintegrator, Marshmallow Mixer, Boiling Pans, Tanks, Electric Motors, from 6 h.p., etc.—List on Application Box B4595.

FOR Sale: one Manesty "U" shape stainless steel Mixer, stainless throughout. A.C. motorized automatic tipping. All safety devices, totally enclosed when working, size 30 in. by 20 in. by 17 in. new condition. £265. Also small Jos. Baker tipping Mixer.—Sadd, 13, Corporation Street, Stratford, London, E.15.

GAS Boiler with full automatic controls; 2-pan and 3-pan gas Ranges; Potato Cleaner; Centrifugal Extractors with Beaters; Thermostat-controlled gas Oven; Crisp Cutters; Automatic Weighing and Filling Machines; gas-heated Boiling Pans, etc.—Fuller particulars from, or Plant may be inspected at, Brown, Wills and Nicholson, Ltd., Prince Rock, Plymouth.

ONE B.C.H. Currant Picking Machine in good condition, used for only one season. Fitted with 2 h.p., 400 volts, 3-phase motor.—For details apply Box B4570.

1953 Peerless Standard Depositor for sale. Fitted with 100-qt. Hopper and all stainless steel parts, suitable for depositing meat and fish pastes in 3-oz. cartons upwards, or cakes and bread. Specifications 350 volts, 50 cycles, 3 phase. Cost £640 with attachments, accept £525. Unused. Manufacturers' guarantee transferred.—Box B4568.

250 and 500 gall. cylindrical stainless steel Tanks with Agitators; 100 gall. oblong s.s. Tanks; Alite and Johnston "Lightning" Filling Machines; Pyramid Electric Heat Sealers; Hunter "Emulsor" Emulsifiers and Homogenisers; Gardner Mixers, etc. Your enquiries invited.—Sorensen Bakery Equipment Ltd., Drake Street, Manchester 15. Tel.: CENtral 1353/4. 'Grams: Rahbek.

CAN Seamers for sale. Ashworth and Parker, auto vacuum type, capacity 3 7/16 in. diam. by 4¼ in. high, motor driven.—Photo, etc. F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

SECOND-HAND PLANT FOR SALE

TWO Autopack Weighing and Packing Machines up to 2 lb. £75 each. One Pulper with five stainless steel strainer sleeves, £125. One Silkenburg H.T.S.T. £50. One Apothecary Scales and Weights, £10. One brand new Creamery Package Multifo H.T.S.T., £550. One second-hand Creamery Package Multiflo H.T.S.T., £350. One 300-lb. Bartleet Chocolate Kettle, £150. Homogenisers: one 400 g.p.h. Cherry Burrel, £400; one 100 g.p.h. Cherry Burrell, £275; one 200 g.p.h. Creamery Package, £300; one 100 g.p.h. Creamery Package, £250. Stainless steel steam heated Vats, with motorized agitators by Creamery Package and Cherry Burrel, 100 gall. £225; 200 gall. £325. Stainless steel Refrigerated Vats by Creamery Package and Cherry Burrell, 200 gall. £325; 100 gall. £200. Large stocks of confectionery, refrigeration and ice cream plant. Details on request.—Alfred's Ices (1954) Ltd., 3/5, Hall Place, London, W.2. Tel.: PADdington 6619/6610.

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600

SIFTER MIXER by Porteus, mixing trough 62 in. by 27 in. by 32 in. deep, scroll type agitator, bottom gate discharge, brush sifter; drive through gearing by vee rope from 6 h.p motor, 415/3/50.

Horiz. Powder Mixer by Alite, capacity 400 lb. size 58 in. by 28 in. deep, fitted broken scroll agitator and 4 in. sq. centre outlet with sack mouth. Drive through spur reduction gears by 5 h.p. motor, 400/3/50.

Vert. open top Mixer by Kellie, 30 in. diam by 22 in. deep, 50 gall. capacity, 16G. F.D.P stainless steel lined monel metal coil heating, and 1½ in. centre outlet. Mounted on tubular legs, stainless steel fittings, and horiz. three arm nickel silver agitator motorized 380/420/3/50, 31 r.p.m.

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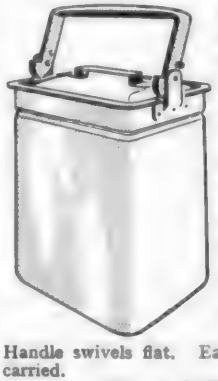
CAPACITY 3 GALLONS **Height 12"**



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Send details to:

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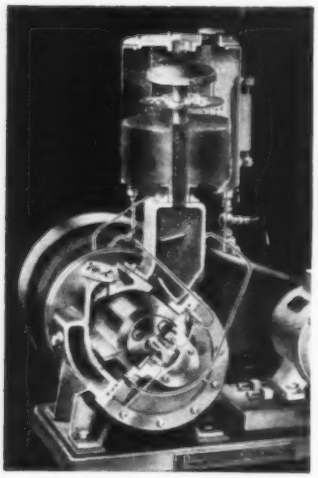

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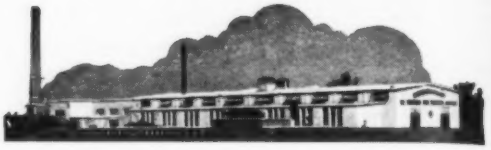

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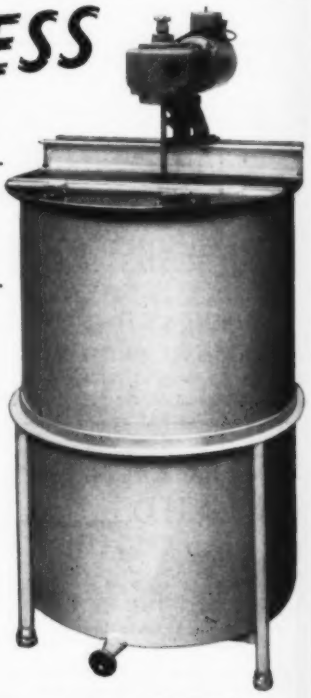

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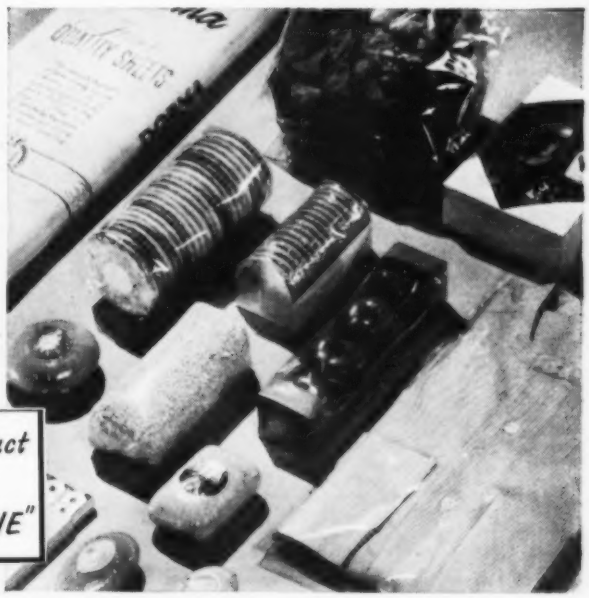

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